GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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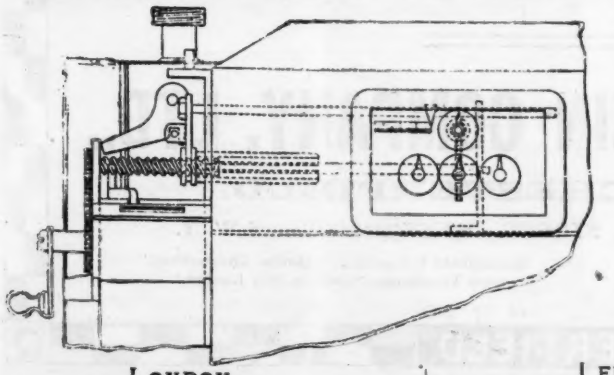

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CL., No. 2981.] TUESDAY, JUNE 29, 1920. [72ND YEAR.

CHANGE OF DAY OF PUBLICATION OF THE "JOURNAL."

FOR about sixty-five years out of the seventy-two years the "JOURNAL" has been in existence, its day of publication has been Tuesday. But a change has now to be made to Wednesday; and this will begin with our next issue. The alteration is not our desire, and therefore not of our seeking. It is due to a movement which is growing in the printing industry, for ceasing work between Friday evening and Monday morning—irrespective of the wishes of customers who provide the employment. A majority of the men at our printers' apparently dissent from the command that "six days shalt thou labour;" and so they have, not now content with spreading their hours of work over five-and-a-half days, decided to press them into five days—to our inconvenience, and creating the necessity for changing the day of publication. Readers must exonerate us from all blame for the change; and they will find no difficulty in placing it upon the proper shoulders.

EDITORIAL NOTES.

Postponement of the Strike Notices.

THE gas-workers' strike notices have been suspended until next Saturday. This was the good news that came from York last Thursday evening, as a result of a conference in the city of representatives of the Unions concerned in the dispute. There had been signs the preceding days that something of the kind was likely to happen; for newspapers to which there is apparently a channel of communication from the employees' side had intimated that, rather than precipitate the country into the inconvenience and waste that would arise from a strike of gas workers, something less than the 10s. increase of wages asked for would probably be entertained. There is no doubt, too, that had a strike occurred last Saturday, or should one come later on, public opinion would set hard against the employees and the Federation of General Workers. However, we will not talk of what may happen of a disagreeable nature; but rather regard the matter from the standpoint of a possible peaceful solution. We take little heed of the hotheads among the workers in some quarters, who are crying out for a strike unless the last penny of pay and hour of abstention from work that have been demanded are granted, while men like Mr. Clynes, Mr. O'Grady, Mr. Hayday, and Mr. Will Thorne (all Members of Parliament) are among the leaders chiefly concerned. They are men who only believe in the strike as a last resort; and one and all know that the history of the gas industry is not, speaking of it as a whole, a bad one in the relations of employers to employed. They know, too, of the hard times through which the industry has been passing, owing largely to its statutory restrictions, and the high price to which its raw material (coal) has risen, largely through the excesses of the miners. They are fully aware, too, that the industry must be assured beyond any possibility of doubt of prompt relief from its financial difficulty—the chief of its manifold troubles—before it can conclude any reasonable agreement with the workers. The representatives of the Unions concerned had to go to York with some knowledge as to what might be the lines of an agreement; and the resolution passed at the conference intimates, so far as the primary claim goes, that 1s. per shift (6s. a week) is what is in mind. The suspension of the strike will give opportunity for further negotiations. According to present arrangements, the Negotiating Committee will meet in London to-morrow (Wednesday); and therefore, it is hoped, the immediate days will disclose, with better definition and certainty, the positions of both parties. We do not believe the Unions really want a conflict; and the gas industry knows full well that, in the interests of the country, it is its duty to avoid conflict if reason provides a way for doing so.

The Bill Revised—Inerts Question Suspended for Further Investigation.

THE gas industry will receive the intelligence with every gratification that the Gas Regulation Bill has passed its review, and has been trimmed and improved, by Standing Committee A, which did its work in a very business-like and judicial way, with Sir William Pearce in the chair. The discussions occupied from Tuesday to Thursday; and the measure, according to the official arrangement, will be reported to the House to-day. Excisions were effected, additions made, and a mass of new suggestions was rejected; and altogether, it may be said, that in the result the Bill is a materially better one than its original draft, though in the two main respects—the new heat-unit basis of operation, and the financial revision proposals—the principles incorporated in the original draft remain unaffected, but are somewhat more explicit. A great deal of interest was shown throughout the proceedings in the work of revision not only by members of Parliament, but by the parties who were concerned in the proposals to be made. Throughout, their representation was good—in point of numbers. Watchful of every suggestion, word, phrase, and clause were the President of the National Gas Council (Mr. D. Milne Watson), the President of the Institution of Gas Engineers (Mr. Thomas Goulden), and the chief officers of the National Gas Council. When the Bill becomes an Act (we will run the risk of giving transient offence to Mr. Milne Watson by speaking of what we know to be the truth), the whole gas industry will be deep in debt to him for the time he has given to, and the industry, the acumen, and the loyalty to gas interests that he has shown (despite at times almost heartbreaking hindrances) in pursuing this work of legislative revision. The task has not been by any means a light one; but the consolation is that, unless something totally unexpected happens, the successful and long-sought end, which will open the way to justice, appears to be now within sight. We should like in this connection to acknowledge the manner in which Mr. Bridgeman (the Parliamentary Secretary to the Board of Trade) has piloted the Bill through Committee, and the work of Sir Henry Cowan and Sir Ryland Adkins.

The capital clause of the Bill, dealing with the price and quality of gas—that is to say, transferring the operations of gas undertakings to the heat-unit basis, and conferring

power on the Board to fix a standard or maximum price per therm, which price shall include an addition to meet the cost increase due to circumstances beyond the control of the undertakers—was given (as will be seen from our report) rather better definiteness; but there was no material change in it. Notices regarding applications under the Act are to be published in the London, Edinburgh, or Dublin Gazette, as the case may be; and all the county, borough, urban, and rural district councils within the limits of supply of the applying undertaking are to receive notification. With regard to the obligation of gas undertakers, on any alteration of the declared calorific value, to take, at their own expense, such steps as may be necessary to alter, adjust, or replace the burners in consumers' appliances in such manner as to secure that the gas can be burned with safety and efficiency, provision has been made to meet the cases of recalcitrant consumers by the insertion of the words "except in the case of any consumer who objects to such "alteration, adjustment, or replacement by the undertakers." There are other changes in the clause, but they are more or less merely structural ones.

In the circumstances of the main objects of the Bill meeting with such universal approval, the outstanding feature of interest to the gas industry is that there is a suspension of decision as to restriction of inerts being imposed that, from the economic point of view, would be altogether inimical to gas suppliers and their customers, and equally unnecessary whether scientifically or commercially regarded, seeing that the consumers will only pay for heat units. This matter was handled by Sir Henry Cowan on behalf of the gas industry; but Mr. Bridgeman was unable to see why there should be so much hostility to limitation from the industry. The Parliamentary Secretary to the Board of Trade is an extraordinarily busy man; and, of course, time alone inhibits him probing into, and keeping himself abreast of, all the scientific evidence which points to the limitations proposed being wholly superfluous, and a distinct obstacle to the development of the industry on the lines which will realize the largest degree of economy. It was palpable that the Committee felt they were not competent to deal with this question, which is a purely scientific one; and Mr. Bridgeman admitted that it was highly technical. He therefore consented, and in fact himself proposed, that it should be the subject of inquiry in conjunction with the carbon monoxide phantom. The inerts question is therefore in a state of suspension. If after its arraignment before a competent tribunal, in a dock adjoining that in which carbon monoxide will be, it is considered a proper course to put a limitation upon the proportion of inerts, the Board of Trade will under the Act have a discretionary power to issue a Special Order dealing with the matter. When the inquiry comes on, the gas industry will be able to put up a very good case showing, on scientific, technical, and commercial grounds, why it should not be hampered by restriction in this respect—particularly in view of the fact that the consumer is so well protected by purchasing on the heat-unit basis. This plan of charging has made a material difference to the question of incombustibles.

A point upon which there was a short, but lively, discussion was in respect of the clause which makes it unlawful for anyone to charge for the supply of gas on the heat-unit basis unless authorized to do so under the present measure or by a Special Act. In conjunction with this, it will be remembered the Board of Trade were proposing a clause specifically excluding from the Act all non-statutory companies. There is good argument both for and against their inclusion. If the principle of charging upon the heat-unit basis is right for statutory companies, then it is right for non-statutory ones. But there appears to be some objection to non-statutory companies changing the basis of their operations in this manner without other statutory conditions accompanying, to which conditions statutory companies are compelled to operate. In other words, there is objection to non-statutory concerns being their own legislators in every respect—selecting what suits them best, and leaving what does not suit them. No one can blame them for this; they are to be envied in many respects. But, of course, it would be perfectly easy for those non-statutory gas concerns who desire the advantages conferred by the present measure to obtain them by promoting a Private Bill in Parliament, if the result of Mr. Bridgeman's cogitation over the matter between last Wednesday and to-day has resulted in adherence to their exclusion. As to this, we shall know definitely in a few hours' time.

The prescribing and testing machinery proposed by the Bill—the Gas Referees, the Chief Gas Examiner, and the local examiners—has all been adopted as set out in the original clauses with a few structural alterations, one of which gives the Referees and the Chief Gas Examiner power to appoint, with the consent of the Board of Trade, such assistants as may be necessary for the proper discharge of their duties. The requisite authority is also conferred upon the various officials. The Referees will prescribe the apparatus, and may make inspections of it, and the conditions of its installation. But the Chief Gas Examiner, in our opinion, will be the man with a heavy amount of responsibility upon him. Success will depend very largely upon the spirit infused into the carrying out of the intentions of the Act; and the Chief Examiner is the authority who can play an important part in this respect. Illustration of what we mean is found in the way the Alkali Works Regulation Act is administered. The Chief Inspector and the District Inspectors under that Act do not deem their duties to be confined to searching for penalties; they offer helping counsel from their varied experience in keeping the plants and processes which they have to inspect up to a standard of efficiency—thus doing much to avoid the violation of the Act, while not allowing the transgressor, who, through negligence or other obviously avoidable cause, infringes the law, to escape the penalty of his misdoing. The spirit in which the Act is administered is to the greater advantage of the whole country than would be the case if duty were construed as being confined to exploring only for faults that come within the actionable limit. This, however, by the way; but it is hoped the point will not be overlooked, as we are confident that much of the success of the Act—which completely changes our basis of working, and introduces a system which, in the case of many gas-works, will require a little leniency at its advent—will depend upon the officials administering it. The cost of administration is not now to be confined to undertakings selling over 100 million c.ft.; but all undertakings coming under the Act—and all statutory ones will so come—will have to pay their share. There has been a loosening of the stringency in respect of forfeitures and conditions; but if our report does not make the changes altogether clear, they will be perfectly so when the Bill in its final form is available. Compulsory benzol extraction was not accepted by the Committee, nor were the railway companies' preferential clauses in regard to pressure, &c.

Now we must await the further progress of this new Charter for the gas industry. To-night we hope to see the Bill through the third reading in the Commons; and there is no apparent reason why it should not be introduced to the House of Lords this week, and quickly get through its remaining stages. It is a matter of great urgency that the industry should be assured of a better financial position.

Coal Wages, and Regulation of the Coal Industry.

SOME statistics were given in last week's "JOURNAL," on the authority of a White Paper issued by the Board of Trade, which show conclusively the absurdity of the miners' notions as to reducing the price of domestic coal and increasing their wages, without something in the nature of a miracle happens, if the coal industry is to be run on economic lines. That such a sane idea as conducting the industry on economic lines should be entertained by a majority of the members of the Executive of the Miners' Federation is altogether out of harmony with their policy of harassing the Government as much as possible. The Executive have considered the statistics published by the Board of Trade, and, in the result, have decided to recommend putting forward a claim for a further wage advance of 2s. a day for men and 1s. for boys, as well as a reduction of 14s. 2d. per ton in the price of domestic coal. The men who make demands of this character, in the face of the conditions existing in the coal industry, are the very men who want to take a large share in governing the destinies of the industry; and there is no doubt they are heading direct for the rocks. The dual proposal (the reduction in price of domestic coal is not an alternative to the increase of wages) is more moderate than some of the members of the Executive would have preferred; and the demand lies between the extravagant ideas of that section and the other section who have a notion that the workers in other industries will soon begin to rebel against the autocratic methods of the miners, who are depreciating the economic status of the industries that give those other

workers employment, and are raising to a prohibitive extent the cost of the fuel for their domestic hearths. The new claim has to be brought before the annual conference of the Federation before being officially submitted; and then it may be found that it will not satisfy the larger body of the men's delegates.

The question of nationalization may also be revived at the conference; and certain it is that the alternative that has been put forward by the Government in the Ministry of Mines Bill will come under review and severe criticism —from the Federation point of view. Mr. Robert Smillie, who has lately returned to the limelight, has already violently declaimed against the attitude of the Government in this matter and the price of coal. If, however, those who want nationalization would only look at things rationally and in true perspective, they would see that, if they cannot get all they want in one leap, then the next best thing is to proceed by steps, even though short ones. A step away from the present conditions is provided by the Bill; and it would be far better to give the scheme a trial than to reject it. The same decision has been come to by the Government respecting the question of the nationalization of the railways, in regard to which Government supervision is preferred to nationalization. So far as can be seen, until competent criticism is brought to bear, which may or may not modify one's opinions, the Ministry of Mines Bill provides a simple form of bringing the coal industry under better regulation, and that without any considerable expense over and beyond what is now incurred in exercising the powers and duties vested in other Government Departments—the Home Office and the Coal Controller's Department. The proposed mode of doing this will be by establishing a Ministry of Mines, which will be an additional department of the Board of Trade; and this department will have concentrated in it the functions relating to the industry now performed by the departments already named. An official statement has been made to the effect that beyond the salary of £2000 payable to the Minister of Mines, the new Ministry is not likely to involve any substantial increase in expenditure. The clauses of the Bill will confer on the Minister, for a limited period, powers to regulate coal exports, pithead prices, wages, and the distribution of profits, all of which, it is obvious, will be necessary for some time to come. At any rate, it is contemplated that the new measure shall continue for a year the powers contained in the Coal Mines Emergency Act, which expires on Aug. 31. Provision is made for continuing the Act until the present Bill becomes operative, or alternatively till March 31 next. Advisory Committees, it is proposed, shall be established on which other than the coal-mining interests will be represented; and here large coal-consuming interests, such as the gas industry, should obtain a voice. Pit and district committees will be among the machinery; and their duties will involve the consideration and making of recommendations concerning workers' conditions, questions affecting output, and wages disputes. Area boards to formulate schemes for adjusting wages are part of the project, as well as a national board to deal with questions affecting the industry as a whole. A fund is contemplated for improving the social conditions of the miners. On committees and boards it is intended there shall be equality of owners' and workers' representatives.

This in brief is an outline of the scheme embodied in the Bill. Nothing can be worse than the present conditions of uncertainty and obscurity. Anything that can improve these conditions will be welcome to the gas industry; for no industry can be more sick of the coal situation than it, seeing that coal is its raw material.

The New Appreciation of Coke.

ONCE a much despised fuel, other than for special purposes, coke is now being regarded with a greater amount of amity. At one time, it was a sort of pariah among the fuels. This was not its fault, but was due to the fact that people expected it to behave itself equally as well as bituminous fuels used in more or less crudely constructed appliances, though its physical characteristics differed so considerably. That was the trouble. Coke is a good fuel and servant when employed in appliances suitable for its combustion. We have seen what a difference it makes to the use of coke for steam-raising when the owners of boilers get even a general grasp of the elementary principles governing its use. From it substantial economies and working advantages have been realized in boiler firing simply by proper feeding and the necessary forced draught—the coke being either burned alone or in combination with coal in stratified beds, as on the Nicol patent system. Using coke with coal, fuel beds are made more porous, combustion is promoted, and the evils attending all coal use are diminished proportionately. The virtues of coke, and the help it can render, are getting better known in industry. There is domestic use. The interim report of the Committee on Smoke and Noxious Vapours Abatement shows that, in this respect, the Committee see a large field for the useful application of coke, which would result in all the economies and healthful advantages that must emerge from the employment of smokeless fuels. It may be that the supply of coke will become still more plentiful as gas heating increases, as it is expected that it will do, for both industrial and domestic purposes, unless complete gasification is largely resorted to, and reduces the output of coke, which, of course, suffers from the disability that it is not so easily transmitted as gas from place of production to place of use. Assuming, however, that the output of coke increases, it is clear that it will want a larger market than it has hitherto had.

Incidentally, it may be remarked that it would be advantageous if its ash-content was diminished by the supply of cleaner coal to gas-works. In their full report, we hope the Committee will make a strong point of this. A cleaner coal would be a consideration of immense importance in promoting the popularity of coke. To a larger market for domestic purposes, the Committee in their report point the ways; and these ways are through properly constructed appliances. Good quality coke, the Committee remark, will give, in a suitably constructed grate, a particularly bright glowing fire and a higher radiant efficiency than coal; and its combustion can be started by the use of a small quantity of coal or by a gas-jet. Coke, the Committee also find, is an economical fuel for heating water both in closed and open stoves, and for use in certain types of kitchen ranges. The Committee do not speak and recommend without the authority of experience. They are very strong indeed on central heating and hot-water supply for dwellings built on the tenement or block plan; and it cannot be denied that there is a good deal to be said for the system. They have also been attracted by central heating in individual houses. Members of the Committee visited the Austin Motor Company's village at Northfield, near Birmingham, where each bungalow and house has it own central heating served by a coke-stove which sends hot water to the radiators, and by means of a calorifier also furnishes a domestic supply of hot water. And this is accomplished on a weekly consumption of 1¾ cwt. of coke per house. The preparation of food is performed by gas-cookers. In the brick-built houses on the estate, in addition to central heating, one of the living-rooms is heated by a gas-fire.

With regard to hot-water supply from a central station for heating and domestic purposes, there is no experience of it in this country for detached houses. But before long there should be good experience available. The Manchester Corporation have in hand a scheme for supplying an estate of 2000 houses with hot water from a central station —the water having a mean temperature of 140° Fahr. It is claimed that in this case the saving on separate house fittings will be more than sufficient to meet the estimated cost of the central system. The upkeep is calculated at only 1s. per week per house; and the total cost, it is believed, will be easily met by 1s. 6d. per week for a continual supply of hot water. Here, again, it is said that coke can without difficulty be used as the fuel. In other directions at present, a system of thermostatically controlled gas boilers, or coke-heated boilers, for each house is preferred; but the Committee will welcome the experiment of central station supply for detached houses. The great objection to it are the heat and stand-by losses, with hot water an intermittent requirement, and the variations in volume considerable as between season and season where domestic heating and hot-water supply are both catered for.

The Committee are not wedded to hot-water supply for all situations; and they draw attention to the varieties of gas and coke heated arrangements that are available for individual house use. The gas-heated apparatus we know about; but there seems to be quite a fair amount of apparatus for the use of coke which has not received any very prominent publicity. However, the Committee are convinced that for dwellings on the tenement or block plan, a central system of hot-water supply for heating and domestic

purposes is quite the right thing; and the proper fuel for heating the boilers is coke. Liverpool has the system in use in the case of sixty-six tenement houses; and this is spoken of as "successful." An extra rent-charge of 6d. per week covers all up-keep expenses, the tenements are very popular, and the tenants do not waste the hot water. Such tenants deserve this recognition of their uprightness. The Committee's report shows, and the schemes in hand prove, that coke is coming more to the front among the fuels. Its virtues simply required development by proper treatment; but the general realization of this has been painfully slow.

Summer Time.

France this year decided to make the change of the clock in summer time a permanent institution—being persuaded that it is not only popular, but the producer of economy by substituting for a lengthened period per day natural light for artificial light. In this country only temporary powers at present exist regarding daylight saving; but the Home Secretary states that it is the intention of the Government to introduce before long legislation to make it permanent.

Gas and the Cost of Living.

The official figures for June show that the percentage increase in the cost of living over the pre-war standard is 150 p.ct. In the grouped figures, "fuel and light" are put down at 125 p.ct.; but this includes the change in the price of coal—the withdrawal of the 10s. rebate on domestic coal, and the addition of 4s. 2d. per ton on all coal. The actual retail price of coal is 135 p.ct. higher. For gas, the increase over the pre-war figure (allowing for the rebate) is about 65 p.ct.; but it must be expected that this percentage will now ascend somewhat—variously according to proximity to coal-fields or distance from them—owing to the rise in the price of coal and the demands of the gas workers. Even then the average percentage will be considerably below the percentage increases of other commodities; but, of course, there is such a thing as a commercial limit to price in competition with other commodities for light, heat, and power.

The Railway Wages Increase.

Being large users of the railways for their coal, secondary products, and goods carriage, the gas industry is concerned in the factors that have caused the rates of carriage to ascend so considerably. It will not surprise readers to learn that the railway wages bill has risen to upwards of three times what it was in 1913. In that year, the annual wages bill of the principal railways was about £49,000,000; but we agree there were then classes of the workers that were underpaid. Now the estimated wages bill in a full year, taking into account all increases authorized to date, and including the cost of the eight-hour day, is about £163,000,000. Mainly owing to the eight-hour day, the staff of the railways has been increased by 23 p.ct.

The World's Oil Output.

In all parts of the world that are oil-producing, there is an intensified movement to increase the yield; and last year there was success. According to the "Petroleum Times," the world's output was 559,539,239 barrels, compared with 516,801,354 barrels—showing an increase of 8·27 p.ct. The United States led with 377,719,000 barrels, compared with 355,927,716 barrels in 1918. Mexico followed with 87,359,436 barrels, as against 63,828,327 barrels in 1918.

Coal Output.

The weekly coal outputs just lately have not been up to the best levels of the year. For the week ending June 12, the production was 4,739,769 tons; in the week ending June 5, it was 4,718,183 tons; in the week ending May 29 (Whitsuntide), it was 3,199,947 tons; and in the week ending May 22, it reached the best figure of the four weeks—4,830,707 tons.

Dirty English Coal.

We complain in this country of the percentage of incombustibles in the coal delivered to gas-works, under the modern notions of what is the proper material to deliver under the designation of coal. But we have not yet had anything to match a complaint of the manufacturers in the Department of Seine-et-Oise of the coal being delivered to them from England, and acceptance of some of which they have refused. Report says in one case two barge loads sent to the Argenteuil district were refused owing to the coal being useless. The departmental coal office at Versailles appointed two experts to analyze the material; and their report was to the effect that the consignments consisted of 80 p.ct. stone, 10 p.ct. earth, and 10 p.ct. coal dust. An expert appointed by the shippers, while acknowledging that these conclusions were well founded, contended that the stone was not really of a flinty nature, but was composed of petrified coal.

PERSONAL.

Mr. and Mrs. J. W. Carmichael were the guests of the employees of the Barrhead Gas Company at a recent social function, presided over by Mr. Robert Doig. After tea, Mr. David Millar referred in an appreciative manner to the character and services of Mr. Carmichael, who is, owing to ill-health, retiring from the position of Manager to the Company, which he has held for 34 years. He asked Mr. and Mrs. Carmichael to accept their portraits in oils, with every good wish of the staff and employees. In the course of his thanks for the handsome gifts, Mr. Carmichael spoke of the excellent relations which had always existed between himself and those under him.

We learn with regret that, owing to advancing age, Mr. Robert Fish is to-morrow [June 30] retiring from active duties as Engineer and Manager of the East Cowes Gas Company, after having had charge of the works for 27 years—for 14 years from 1893 as lessee. Under his management, the works have been well equipped. The carbonizing plant is on the Klönne regenerator principle; and the average make of gas per ton of coal carbonized is 13,000 c.ft., with 21 p.ct. of fuel. The unaccounted-for gas for several years has not exceeded 3 p.ct. The Directors of the Company, appreciating Mr. Fish's services and ripe experience, have offered to appoint him Consulting Engineer. Mr. Fish is much esteemed and deservedly popular at East Cowes, having always identified himself with the interests and welfare of the town. He served as a Guardian, and for some years was a member of the Urban District Council. For 26 years he was a Director of Messrs. Edward Cockey & Sons, of Frome; and he has recently been unanimously elected an honorary member of the Isle of Wight Gas Association. Mr. Fish has just completed his fifty years' membership of the Institution of Gas Engineers, having been elected in the year 1870, while Manager of the Hornsey Gas Company. He was twice decorated by the late King of Roumania with the Star of Roumania on the occasion of the Russo-Turkish War; and with the Crown of Roumania on the occasion of his departure from Bucharest.

In the examination lists issued last Saturday by Armstrong College, Newcastle-upon-Tyne, appears the name of Mr. Geoffrey Weyman, who passed for the degree of D.Sc.

Mr. Henry D. Lumb, late of Brentwood, has been appointed Engineer and Manager of the East Cowes Gas-Works.

"Grasshopper" Holder Connections.

Photographs have appeared in the American Technical Press of two actual installations, at Lancaster (Pa.) and Bloomington (Ill.), of "grasshopper" connections by the Western Gas Construction Company, Fort Wayne (Ind.), which have successfully solved a troublesome problem. What was needed in both cases was a larger connection between the water-gas set and the relief holder, due to the greatly increased demand of consumers. The connections adopted—which bear their name because of the suggestion they give of a grasshopper's hind leg—were installed under the personal supervision of Mr. A. C. Howard, the Gas Engineer to the United Gas and Electric Engineering Company, of New York, who declares that he sees in it a good way out of a difficulty which has presented itself in many plants. Formerly, in order to provide a larger connection between a gasholder and a water-gas set, it was thought necessary to make an expensive excavation in which to lay the piping, to empty the water-tank and clean it, and put the holder out of use for a considerable period. But this new overhead plan makes it possible to establish a connection at low cost, without putting the holder out of action at all. The use of a counterbalance and a vertical hinged leg, serves to remove all vertical and horizontal loads from the holder crown; and the holder operates as freely as before the connection was made. That is to say, the "leg" moves with the rise and fall of the holder; but it does not disturb the smooth operation of it. The use of a large inlet-connection to a relief holder in a water-gas plant means, it is pointed out, the saving of oil and money; and the "grasshopper" connection is presented as the solution, without unnecessary excavation work, and without the annoyance of a shut-down of part of the plant.

Sir John Boraston, J.P., of Beckenham, a Director of the South Suburban Gas Company, left estate of the gross value of £6192. Estate of the value of £174,537 has been left by Dr. Rudolph Messel, who was Managing-Director of Messrs. Spencer Chapman and Messel, chemical manufacturers. He bequeathed practically the whole of the property to be divided into five parts, four of which he left to the Royal Society, and one to the Society of Chemical Industry.

ELECTRICITY SUPPLY MEMORANDA.

THERE are electrical engineers who are still enamoured of the idea of utilizing coal carbonization in some form preceding the generation of electric energy, notwithstanding the warning and calculations in the Nitrogen Products Committee's report, which showed pretty conclusively that, from the economic point of view, the electricity industry cannot hope to improve its position by itself undertaking coal carbonization as a prelude to its generating functions. The Power Sub-Committee of the Coal Conservation Committee, it will be remembered, had visions of coal carbonization preceding generation. But capital expenditure, working costs, the absence of markets that the gas industry possesses, and so on, do not give any hope of the industry making a profitable venture of preliminary carbonization. The most profitable method would be for electricity generating plants to be erected adjacent to gas-works, and for the hot coke from the retorts of the latter to be treated in ammonia recovery gas-producers, and the resulting gas be supplied to the electricity station. Mr. C. H. Merz, who was Vice-Chairman of the Power Sub-Committee, is still looking with longing eyes upon coal distillation yielding not only fuel, but increased profit to the electricity industry. He showed, during the discussion at the Institution of Electrical Engineers on Sir Dugald Clerk's paper, that the old flame in this respect has not diminished in intensity. We believe he is engaged on experimental work with a low-temperature distillation system, in which every road that will contribute to thermal efficiency is being explored. He wants the power gas and all the liquid products that he can obtain. The ideas that are incorporated in his plant show that the heat balance-sheet should be good, but what the financial balance-sheet will be like is quite another matter. We have published abstracts of the patent specifications lodged by Mr. Merz and his colleagues. The first feature is that the coal is distilled in a retort by passing superheated steam or other gases through it at a comparatively low temperature—say, about 500° C. The incoming coal is superheated by waste steam; the hot coke is utilized in the furnaces of steam-boilers, or in auxiliary gas-producers; the power gas is used either for generating steam for use in a steam-turbine or directly in an internal combustion engine; the boiler feed water is also heated; and in other ways there are proposals for the conservation and application of heat. How it will all work out in practice is not known; whether it is going to pay better than solid fuel use is as yet a mystery. Experimental and then working perfection have to be reached before financial judgment can be passed. Meantime, Mr. Merz, in the discussion on Sir Dugald Clerk's paper, said electrical engineers would welcome all advances that could be made in coal carbonization, and the cheapening of clean and easily handled B.Th.U. But does not Mr. Merz look upon what he is doing as an advance, and does he not consider that it is the very best that can be done according to contemporary knowledge of such matters?

Merz Carbonization Ideals.

The Sheffield Corporation Electricity Committee and their Engineer (Mr. S. E. Fedden) are rather inclined to the view that it is better for other people to do the carbonization and take the risks. In the "Memoranda" for June 8, we referred to a recommendation regarding the supply by the Low-Temperature Carbonization Company, of gas and oil to the Electricity Department for dealing with three boilers. The matter was referred back by the City Council for further information. According to Mr. Fedden's report, the Company undertake to generate steam in three boilers at Blackburn Meadows power station, by either gas or oil, at the same cost as coal firing. In addition, the Corporation will have to pay 6 p.ct. on the cost of fitting the boilers, supplying and erecting an oil tank, &c. This, it is stated, will represent £300 a year. On the other hand, the Company are to indemnify the Corporation if, for any reason, gas cannot be supplied, or if the scheme is unsuccessful. The economies predicted are: One man will be able to take charge of the three boilers; and the high removal costs of ash and clinker will be non-existent through the absence of these troublesome substances—more troublesome and weighty to-day through the dirty condition of coal. The present cost of removing the ash and clinker is 5s. a ton; and this is important in view of the ash content being about 20 p.ct. It is proposed that the contract shall be for ten years; and it is intended that it shall be made on the understanding that, if the scheme is unsuccessful, no expense will devolve upon the Corporation.

Economies of Gas and Oil Firing.

Speaking of Sheffield, a curious condition of things has arisen there. The Electricity Supply Committee recently proposed to increase charges from 40 to 50 p.ct. on all current priced at above 2d. per unit; from 75 to 105 p.ct. on all units charged at 2d. or under; and from 50 to 75 p.ct. on all units supplied to the tramways. There has lately been noticed a disposition to put a higher percentage on the lower priced units; and this is correct, as some of the charges for these allowed little or no margin for higher costs of fuel, labour, maintenance, renewals, and general outlay. Without a sufficient increase in them, an unfair burden properly assignable to power and heating supplies would be thrown upon the lighting consumers. We see this trend in the recommendations of the Sheffield Electricity Committee. But the "Electrical Review" states that the City Council have thrown a "bombshell into the electricity supply industry," by over-riding the advice of the Committee and the Electrical Engineer, and deciding to adopt the same rate of charge for both lighting and power. "This is a consummation," says our contemporary, "to which all station managers have long looked forward wistfully;" but, it asks, "Is the time yet ripe for so drastic a proceeding?" We should not think it was, and cannot see the necessity for asking the question. We have on occasion criticized—not differential prices for power and lighting, but the big margin that has existed between the charges for lighting and for power units—especially in those areas where the industrial load is equal to, and in cases greater than, the lighting load. In such circumstances, why should a man with only a small electric-motor, which he uses intermittently, have his supply at 1d. to 2d. per unit; while a substantial long-hour lighting consumer has to pay 6d., 8d., or perhaps more per unit? There has been a great sacrifice of old electrical principles with the change of conditions.

Equal Prices for Power and Lighting.

Some time ago, one of our electrical contemporaries boasted that the percentage increase of price in the case of electricity since the war started was lower than in the case of gas. Of course, our contemporary was speaking without authority, and without knowledge. Increases of 100 p.ct. and over are common in the electricity industry. "Field's Analysis" of the accounts of gas undertakings gives some information which will be enlightening to our friends. It shows [as the article in last week's issue of the "JOURNAL" testifies] that the average price of gas per 1000 c.ft has increased in the case of the Metropolitan Gas Companies by 77·3 p.ct.; with the Suburban Companies, by 76·9 p.ct.; Provincial Companies, by 88·43 p.ct.; and Provincial Corporations, by 59·91 p.ct. This is a different story from the representation of our contemporary.

Percentage Price Increases.

There is a cognate subject. The Highways Committee of the London County Council have prepared a return relating to the supply of electricity in and around the County of London during the year 1917-18. The previous similar return was for the year 1913-14; so that it is easy to see the advance made during the four years that covered the greater period of the war. In the year 1917-18, the number of units sold by the London undertakings was 449,686,063, and by the extra-London undertakings 167,204,097. These figures show increases of 130,715,453 units, or 41 p.ct., for the former undertakings, and 39,858,827 units, or 31·3 p.ct., for the latter. The figures include traction and bulk supply. Power, heat, and traction account for 71 p.ct. of the total of the London concerns, or nearly three times as much as for lighting other than for public purposes. The lighting other than for public use was 26 p.ct. of the total. It is therefore difficult to tell what proportion of the 41 p.ct. and the 31·3 p.ct., representing the four years' increase on the total use of electricity, is the growth for private purposes. Of course, too, it is impossible to make any accurate comparison with gas—seeing that the basis for gas in 1914 was so much greater than for electricity. We speak of thousands of millions of cubic feet of gas as compared with hundreds of millions of units of electricity. The three Metropolitan Gas Companies sold in 1914 42,139,000,000 c.ft., and in 1919 46,697,000,000 c.ft.—an increase of 4,558,000,000 c.ft., or 10·82 p.ct.; and this without any "traction" supply. The Suburban Gas Companies in 1914 sold 12,861,000,000 c.ft., and in 1919 15,461,000,000 c.ft.—an increase of 2,600,000,000 c.ft., or 20·22 p.ct. These percentages of increase are spread over the thousands of millions of cubic feet of 1914, instead of over hundreds of millions in the case of electricity, including traction supply. Yet there are some electrical men who—comparing percentages only, and ignoring the base of calculation—say that electricity has been increasing at a more rapid rate than gas.

Increase of Gas and Electricity Business.

The electricity industry will hardly view with satisfaction the interim report of the Departmental Committee on Smoke and Noxious Vapours Abatement; yet they must concede that the Committee have been just. They have very largely advised the utilization of gas and coke as the best labour-saving and non-smoke producing media for adoption for domestic heating purposes. It is the cost of electrical heat units, which the efficiency of the consuming appliances cannot counterbalance, that puts electricity out of court. The Committee state that electricity has been urged as an efficient method for cooking and warming rooms, but not, owing to its present cost, for heating water, nor, we may add, is it efficient in this respect in regard to time. From a hygienic and labour-saving point of view (the Committee also remark) electric cooking and heating has much to recommend it; but "we hesitate to advise its adoption on the evidence before us, in view of the high price at present charged for electricity in many localities." We fully endorse the views of the Committee that gas and electricity undertakers "should be given every facility and encouragement to increase and cheapen the supply of gas and electricity, and

Smoke Abatement and Electric Heating.

that the practice at present followed by some municipal authorities of over-charging for gas and electricity, in order to allocate the profits thus accruing to the relief of the rates, should be discontinued." Not all electricians will subscribe to these views. They would rather see all the facilities and the encouragement showered upon electricity, and refused to gas. As it is, it is dawning upon them by degrees that, anxious as they are themselves to do those things that will cheapen electricity, the gas undertakings are on the high road to cheapen the production of thermal energy their way, and that this will result in the maintenance, if not an increase, of the already big margin that there is between gas and electricity to the disadvantage of the latter in the matter of heating. We see that in an article in the "Western Mail," Prof. F. Bacon, who is a member of the Institution of Electrical Engineers, says: "Last winter I attempted—none too successfully—to keep my small flat warm by means of two clean, but cheerless, electric radiators. But the bills arising from the experiment have left a large and indelible impression on my banking account." The "economics" of electric heating have produced for him "bitter personal experience." To heat a room electrically 15 ft. × 13 ft. 6 in. × 10 ft. high (containing 2000 c.ft.), one must allow from 1½ to 2 watts per cubic foot); so that the electric power required for warming it is from 3 to 4 KW. per hour, making the cost 6d. to 8d. per hour, with electricity at 2d. per unit, or 6s. to 8s. per twelve hours' use. Enough said!

THE "ELECTRICIAN" TABLES OF ELECTRICITY UNDERTAKINGS.

As usual, the "Electrician" Tables of Electricity Undertakings for 1920 are full of interesting information concerning the industry, both at home and abroad. We do not know of a similar publication that gives in compendious form such a mass of particulars relating to nearly 700 British and upwards of 800 Colonial and Foreign undertakings, supplying electric current for light, heat, and power, or utilizing it for traction. The compass of the work is further shown by stating that it deals with British electricity supply undertakings, electricity supply schemes projected, Provisional Orders undeveloped, British electric power companies, Colonial electricity supply works, Foreign electricity supply works (Russia being especially dealt with), Colonial tramways and railways, Foreign electric tramways and railways, and Argentine electricity works. One cannot in a notice go into great detail as to the information—technical, commercial, and professional—that the publication contains. One matter in which we are particularly interested has been the charges for lighting, power, and heating and cooking. They are of all dimensions in pence per unit. There are some undertakings still able to supply lighting units at 6d. and below; but they are relatively few. The frequency of 7d., 8d., 9d., and 10d. is certainly striking. We see, too, the growth of war-time percentages upon the pre-war prices where this system is preferred. One would have thought that by this time, the responsible men of electricity undertakings would have seen the wisdom of translating the percentages into part of the regular charges. The sooner this is done, we should imagine, the better; for the new economic conditions will defy a complete reduction to the old. The percentage has no intrinsic value to-day other than to show the addition that the war and the happenings since have involved. But this has now passed, and in large part to-day's conditions may be regarded as permanent. Anyway the percentage does not conceal the total of the account. For power we see prices ranging from 2d., even up to 5½d. per unit, which cannot be called cheap; or there are the lower priced units garbed in percentages more or less bulky. The heating and cooking units have also risen substantially in price. We see 2d., 3d., 4d., and 5½d. per unit among the charges. Who are the people who can afford to make any substantial use of electric energy for heating purposes at such prices? It is noticed that, in many cases, the power and heating units have ascended in price in larger proportion than those of lighting. This tells a tale. Among the undertakings are a few run by gas companies, and many that are under local authorities who own both the gas and electricity concerns. For those who desire to study data concerning electrical stations, they will find this publication cheap at 10s., with 6d. added for postage. The publishers are Messrs. Benn Bros., Ltd.

National Illumination Committee of Great Britain.—We learn from the Hon. Secretary (Mr. Haydn T. Harrison) that a meeting of the National Illumination Committee of Great Britain was held on June 21, to consider various subjects, including the resignation of the Chairman (Mr. A. P. Trotter), on account of his retirement to the country. Mr. Trotter's resignation was accepted with great regret. Major Kenelm Edgcumbe (Vice-Chairman), being proposed as his successor, accepted the position, and is now Chairman of the Committee. Dr. F. P. Hyde (Vice-President of the Illumination Commission, and delegate from the American National Committee) attended to discuss the future policy of the Commission, and explain the views of the various Continental Committees he had attended. It was unanimously agreed that a meeting of the International Illumination Committee should be held in Paris next year, to discuss technical subjects.

GAS IN THE SICK ROOM.

THE success attained by the Gas Light and Coke Company in convincing members of the medical profession of the undoubted advantages as well as the eminent suitability of gas as a heating agent in both living and sleeping rooms, is as widely known as it has been well deserved. The campaign was energetically undertaken; and in spite of the results achieved, propaganda work in this direction is, wisely, still being persevered with.

During the past week, at the Royal Horticultural Hall, Westminster, there was a Nursing Exhibition and Conference, which was visited each day by large numbers of those engaged, in one capacity or another, in the work of tending the sick. Of interest to such people, there were many things to be seen; but certainly the most prominent of the exhibits was that arranged by the Gas Light and Coke Company, who had tastefully fitted-up one of the annexes with a series of model rooms, in which was displayed apparatus of a character in full keeping with the occasion, and amply provided with literature relating thereto. The largest share of the space was occupied by a kitchen, in which, throughout the day, the lady demonstrators of the Company were engaged in preparing just the kind of delicate food which would appeal to an invalid. For this purpose, there was being utilized a Fletcher-Russell externally-heated cooker, with automatic bye-pass gas lighter. In one corner was a sink, to which hot water was fed by a Potterton boiler; other appliances being a Richmond hot-plate, a Fletcher-Russell gas-fire, a gas-iron, and a coke-boiler. The last-named was the "Beacon" coke-fired boiler, which is designed to stand in a kitchen, replacing the coal-fired range, and forming an excellent adjunct to the gas-cooker. The doors when opened reveal a large bright fire; and the bottom door forms a support for flat-irons, &c.

In the rest-room was a John Wright & Co. "Cabinet" combined gas fire and cooker. This has been expressly designed for use in flats, suites of chambers, &c., and must prove of the greatest possible use to persons living alone, who have to cook their own breakfasts, and also an evening meal on returning home from business. There are separate gas-taps, so that the fire and cooker can be used alone or together. There is a good-sized grilling oven, with fall-down front door. The top is closed with a hinged cover; and the grill deflectors may be lowered or raised as required for boiling or grilling. The third apartment was a bathroom, fitted with two of Ewart's geysers, which, instead of being in polished copper, were of black nickel finish. The same treatment is being applied to bath-taps and lavatory fittings. Busy housewives short of domestic help will no doubt find it a great advantage to be spared the labour entailed in keeping polished brass and copper bright. On the stand were a Davis steamless radiator, and a Ewart heated towel-rail.

The lighting was, of course, good; the principal fittings being some turned-out by the Company themselves from their brass stores. These were for indirect lighting, in oxidized silver, with silica bowls. A point about them is that the gas-feed is so arranged as to be practicably invisible. A new inverted adjustable reading lamp and some neat fittings with attractive silk shades completed this portion of the exhibit. For lighting and extinguishing, pneumatic switches were provided.

INDUSTRIAL HEATING BY GAS.

A TRIBUTE TO M. MÉKER.

AMONG the papers read at the recent congress of the Société Technique du Gaz en France was one reviewing the advances made during the war in France in the use of gas-heating for industrial purposes, and making acknowledgment of the services rendered by the firm of Méker & Co. in this field.

It is admitted that in 1914 industrial heating by gas was of comparatively small account in France. Manufacturers held aloof from it; and while in England since 1911 the metal foundries of the Royal Mint worked with gas, in France it required a vigorous campaign to persuade bakers in Paris to use gas for their ovens. In certain small metallurgical operations, and in some special processes—such as the singeing of fabrics, or the roasting of coffee—gas found some small industrial use, but in very much smaller measure than the 30 or 40 p.ct. of the total consumption as in Manchester or Sheffield. When, however, the manufacture of munitions of war called for rapid and effective processes, at a time when solid fuels of good quality became progressively scarcer, there arose a general use of gas for the heat treatment of metals and particularly of steel. From the beginning of 1915 furnaces heated by gas came into use for all operations in the manufacture of shells, &c., and for many other purposes in the war-created industries.

Among the manufacturers who took up the onerous work of designing furnaces and heating appliances for these various purposes, the firm of Méker & Co. should be placed in the front rank. M. Méker had long been a specialist in the study of industrial heating appliances, and had carried out some important applications. His name was perhaps best known by the burner of his invention, in which by a reduction of the diameter of the gaseous mixture inlet, and by means for its effective cooling, the rate

of combustion is increased, and back-firing is avoided. He was at once immersed in his new task. From the early part of 1915, his factory at Courbevoie supplied to munition works the many different types of furnaces required for the treatment of metals; and during three years his output expanded greatly beyond the widest limits which he could have imagined. The most delicate problems of metallurgical heating were often referred to him. As metal became scarcer, more exact processes were demanded; for waste of material had to be eliminated at all cost. Then as the war progressed, a continuously more rapid production was achieved. The many varied operations, and the diversity of the materials to be treated, led M. Méker to design an immense number of different types of furnaces, fixed, rotary, continuous and intermittent, working with ordinary and with compressed air, but all equipped with the Méker burners the excellence of which thus received final confirmation.

The great development of industrial heating by gas during the war has, however, its source of anxiety for gas-makers. When coal and labour are difficult to get and when gas is sold at a loss, it is not possible to extend a welcome to appliances consuming from 20 to 100 cb.m. of gas per hour. Nevertheless the extraordinary development in the use of gas may be considered to have been of great service to the industry. Manufacturers and workmen have become accustomed to use it, and have generally been satisfied with the results. They have learnt to appreciate the cleanliness, speed, and uniformity of this mode of heating, its ready control, and the advantages which are afforded by a fuel that has not to be stored nor handled, and one moreover which economizes both time and material. It is for gas engineers to turn to account this opportunity favourable to the development of their sales when conditions of supply and price allow them to seek new outlets for gas. There is no doubt that manufacturers who have learnt much in the course of the war will not hesitate, or will hesitate less than they did, to adopt it for all heating processes where its use is possible. The appliances which serve for the treatment of war munitions can serve, and are serving at the present time, in identical operations for the manufacture of other goods.

M. Méker having entered his different types of furnace in the competition of the Société Technique, the Committee have decided that it could not effectively make a particular study of each of them, and has therefore considered it much better to recognize M. Méker's services in the field of industrial heating by gas by awarding him an extraordinary prize of 600 frs.

SIXTY YEARS AGO.

[From the "Journal" for June, 1860.]

Purity of Gas.—Our present issue contains the report of four additional days' proceedings of the Committee on the Metropolis Gas Supply, and concludes the case of the promoters of the Bill pending before that Committee. The case of the gas companies was opened by Mr. Hope Scott in a manner which indicates their determination to grapple at once with the substantial questions to be settled, rather than to follow the course adopted by their opponents of wearying the Committee by answering the complaints of the parochial authorities, though some evidence may possibly be tendered to disprove Mr. Hughes's assertions with respect to the quantity of gas consumed by the public lamps. Degree of purity, illuminating power, pressure, and price are the real questions to be discussed; and the evidence already given on the two first points has still further narrowed the inquiry. It is not often that we are able to concur with Dr. Letheby in his views as to the obligations of gas companies. It is therefore with all the greater pleasure that we read his evidence, so far as it relates to the chemical views of the case; though when he departs from his special walk, and ventures to give opinions on engineering questions, he gets beyond his depth, and perils his reputation. His evidence confirms all we have heretofore contended for, in opposition to those who have maintained that it was commercially possible to manufacture gas free from some sulphur compounds, or that it was advisable to purify it completely from ammonia. Dr. Letheby now says that a gas containing 20 grains of sulphur and 5 grains of ammonia in every 100 c.ft. is unobjectionable; and, though we may have something to say at a future time as to the manner in which he ascertains these quantities, we are not prepared to dissent from his opinion on these points. The absolute and chemical freedom of the gas from these ingredients, required by the eighteenth section of the Bill, is thus admitted to be an impossibility; and it will be the province of the Committee to determine the extent to which their presence may be tolerated. In strong contrast to the candid evidence of Dr. Letheby is that of Dr. R. D. Thompson, who contended that sulphuretted hydrogen may be present in gas to an injurious extent, although the sugar-of-lead test failed to detect it. Scientific evidence does not enjoy much credit in our Law Courts; and it will not be increased by Dr. Thompson's researches into the modes of detecting the impurities in gas.

The Council of the Institution of Petroleum Technologists have arranged for a series of free illustrated lectures by members to be given in the Canada Building at the Crystal Palace at 6 p.m., on June 30, July 7, and July 14. There will be a further series of four lectures in September.

PROSPECTIVE DEMAND FOR GAS IN THE NEW HOUSING SCHEMES.

By THOS. NEWTON.

AFTER a certain amount of unavoidable, and much avoidable delay, there is now abundant evidence that many new housing schemes are gradually materializing. The rate of progress is phenomenally slow; but, happily, we are progressing. It is reliably computed that, at the present rate of progress, the housing programmes of the various authorities will not be completed within ten years; although the houses are very urgently needed to-day. There is, however, every indication that building operations will be progressively accelerated; and the present schemes will in all probability mature in about one-half of the above estimated time. It is somewhat unfortunate that the reduction of working hours should become operative during a period of house famine, and also during a period in which there is great dearth of skilled labour applicable to building operations. One effect of the adoption of this policy will be to increase the cost, and further the delay of house building; and, incidentally, it will inevitably increase (more than should be necessary) the rents of houses to those of the working classes who desire speedily to occupy them. In this respect, it is as though the working classes have deliberately contrived to raise rents against themselves, just as they have also hindered the rapid production of houses which are so urgently needed by their own members.

However, gas is destined to play a predominant part in the houses now under construction, as well as in those which are to be built subsequently. Thanks to the alertness of those holding responsible positions in the gas industry (including the very wide-awake British Commercial Gas Association) the claims of gas as the unique domestic labour-saver are recognized as paramount.

SUPERIOR ADVANTAGES OF GAS.

The various inherent disabilities under which electricity labours, as regards domestic economy and utility have enabled gas to retain its supreme position. As an artificial illuminant, gas is generally cheaper than electricity. For cooking, it is more convenient and economical; while for water-heating, and for warming the rooms of our dwellings to a congenial temperature, electricity is hopelessly outclassed by gas. In the very nature of things this must be so, when it is realized that 7 or 8 c.ft. of gas contain as many B.Th.U. as are contained in a unit of electricity. This, it will be noted, represents but a halfpenny worth of gas, and in some districts it would represent even less. In view of the pressing need for the exercise of the utmost national and individual economy, it would indeed be passing strange if the superior claims of gas were not fully recognized. Those who advocate the use of electricity as a substitute for gas in the houses now under construction are certainly not thereby contributing to the general welfare in so far as the conservation of our natural and national resources are concerned. Undoubtedly, there has been a large amount of very picturesque language employed to boost the claims of electricity. At one time it was thought that the super-power stations were going forthwith to usher in the electrical millennium. Romancers, and masters of fiction (in more senses than one), proceeded to paint fantastic word-pictures of an electrical ideal which is not likely to be consummated in the lifetime of the present generation. Ex-cabinet ministers and economists took up the story, and (lacking the necessary technical qualifications for the task) covered themselves with ridicule. No wonder that electrical engineers are now almost afraid of their sponsors; and the electrical industry might well be excused for asking to be saved from its friends.

While it is quite true that the exorbitant price of coal, and the almost insatiable demands of the workers have been mainly responsible for the advances in the price of gas, it is nevertheless true that gas to-day is relatively cheaper than it was before the war. The significance of this should not be lost sight of in all our dealings with consumers. It is no exaggeration to state that gas to-day is better value for money than it has ever been; and if proof of this statement were needed, one has only to refer to the percentage increases of everything necessary to run the industry, and compare them with the modest increases in the prices of gas throughout the country.

INTERNAL PIPING ARRANGEMENTS OF THE NEW HOUSES.

Much progress has already been made by giving the necessary publicity to the need of a standard specification being adopted for all internal pipe-work in connection with the new houses. This is very important, and all gas undertakings affected should give this detail their closest attention. It should be laid down as an axiom that all pipes ought to be proportioned to satisfy not only the present, but all conceivable future requirements. In new work, it is always better to err on the generous side—particularly having regard to the general tendency towards the adoption of a lower calorific standard.

Hitherto, the internal piping system of a given building—whether it be a house, shop, warehouse, workshop, &c.—has been too much considered solely as a lighting proposition, without reference to its conceivable ulterior requirements. In such a case, the smallest extra demand (say) for heating purposes, has soon demonstrated the utter inadequacy of the system; and sometimes

loss of business has resulted as a direct consequence. It is far easier to do business and to instal various kinds of gas appliances when the piping system is adequate to supply the additional load than when the prospective installation demands the laying of new supplies. Happily, a more intelligent anticipation of requirements is rapidly superseding the old state of affairs. It is satisfactory to note that in modern housing schemes provision is not only now being made for a gas cooker, and a number of lighting points, but also for a gas-heated wash-boiler, and for one or more gas-fires. Whether or not provision for gas-fires is specified, it is a safe proposition when designing the lay-out to make provision for a gas-fire in the parlour, and one in the front bedroom. In the non-parlour types of houses, provision should be made for a gas-fire in the front bedroom. The possibilities of installing hot-water supplies, either by means of circulators or geysers, should be fully explored. Ultimate requirements should always be borne in mind; and the internal piping system should be proportioned accordingly.

Service and Meter.

Just as the internal piping system of a given house should be of generous capacity, so also should the service be rather more than ample to satisfy all demands that are likely to be made on it. To lay a service which only barely suffices for immediate requirements, and thus ignore the possibilities of the future, is a short-sighted policy. A much better plan would be to lay a service a size larger than that required for immediate use; and the time has surely arrived when nothing less than 1-in. pipe should be laid as a service underground. The initial expense might prove a stumbling block to some undertakings; but it should be remembered that there is less liability of stoppages in the larger service, and it is always ready to meet additional demands which frequently arise from time to time through extensions and developments of the original scheme.

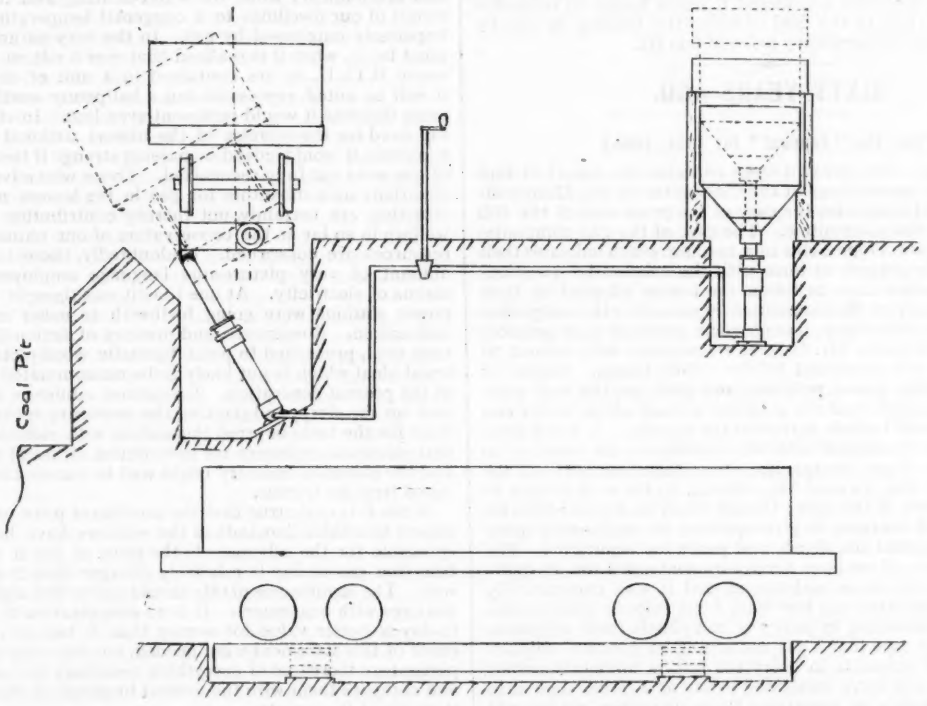
The position of the meter is an important detail. In the past there has been too much of a tendency to relegate the meter to any out-of-the-way corner, whether accessible or not. This, however, is a mistake. The meter should, wherever practicable, be fixed against, but should not touch, the internal surface of an outside wall; and it should be readily accessible—particularly if it should happen to be a slot-meter. Nothing is so exasperating to a consumer as to be compelled to put money in a meter which is fixed in an inconvenient, and sometimes in an inaccessible, position. A meter which is readily accessible at all times saves both time and money to the consumer, and also to the undertaking. Excessive heat, cold, and damp are, of course, very injurious to dry meters; therefore these extremes should be avoided when selecting the location.

Quality of the Goods.

Although the price of everything which a gas undertaking is called upon to buy is abnormally high to-day, nothing will be gained eventually by adopting a policy of cheapness. Unlike most industries, the gas industry is compelled to live in close contact with its work and past labours. Errors of judgment, and mistakes of policy make sorrowful legacies. The use of comparatively cheap service pipes and fittings, main taps, &c., of doubtful quality, are soon reflected in the unaccounted-for gas; and escapes and renewals are more frequent and expensive than would otherwise be necessary. From every point of view it is desirable that pipes, fittings, meters, taps, and appliances should be of good quality, in the interests of both the undertaking and the consumer. By working along these lines, mutual confidence will be engendered, the use of gas will be encouraged and developed, complaints will be reduced to a minimum, and the position of the gas industry will be considerably strengthened and consolidated.

COAL WAGON TIPPERS FOR GAS-WORKS.

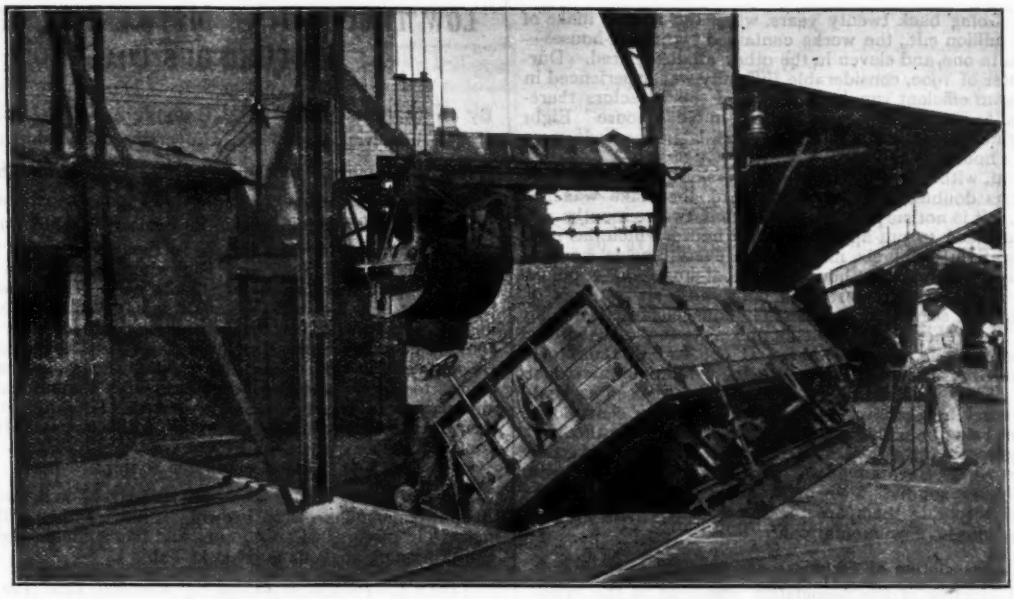
By J. N. Whyte, the Engineer of the San Paulo Gas Company.



Engineers in charge of gas-works in countries remote from the well-equipped engineering plant factories so numerous in this country have frequently to rely upon their own resources when dealing with problems that may arise; and such a case occurred to the writer about three years ago, in his capacity as Chief Engineer of the San Paulo Gas Company, of San Paulo, Brazil, when, owing to the great scarcity of vessels and the consequent need for rapid discharges, it was necessary to speed-up the unloading of coal ships from the pre-war figure of 250 tons per day to at least 500 tons, and in some cases 1000 tons.

Coal is received by rail from the Port of Santos, and is brought into the works in bogie wagons of 10 to 11 tons capacity, fitted with side discharge-doors. These were formerly unloaded by hand into a pit, whence the coal was taken by an electric telpher plant into the coal-store or to the breakers as required. The telpher, with two trolleys at work, could deal with 700 to 800 tons per twenty-four hours; but it was practically impossible to unload even 500 tons from the wagons. Demurrage charges on vessels were enormous; and as the works possessed a steam-driven hydraulic compressor and an accumulator which had formerly been used with a retort-discharger, inquiries were made in England for a tipping platform to be used by the plant. The cost was so great, and the delivery so problematical, that the writer started to design one.

While engaged on the work, the idea occurred to him to utilize the force of gravity, making the coal do what was necessary. It appeared simple to mount the platform on bearings placed parallel with and under the platform, but slightly out of the centre line of the railway track, so that the wagon and platform would overbalance towards the coal-pit. By fitting an ordinary hydraulic ram under the platform, connected by a pipe to a second ram carrying a weight or accumulator, the latter would be raised by the downward travel of the platform, and after the contents of the wagon had been discharged, the accumulator would return the platform and wagon to the horizontal. Calculations, however,



showed that the variation of the turning moment of the platform —from the minimum when the wagon was horizontal to the maximum when it was inclined at an angle of 30°—was so great that the maximum weight capable of being started upward by the full wagon at the horizontal position was quite insufficient to start the empty wagon back from the angle of 30°.

Before discarding the idea, a number of schemes were considered; and the writer finally hit on the expedient of dividing the accumulator into two or more sections, which would be picked-up successively by the rising ram as the turning moment of the descending wagon increased, and on the return journey would be deposited on rest-blocks ready for the next wagon.

Sketches indicate the principle of the idea, and the photograph shows a 10-ton wagon being discharged. The operating gear is seen to consist of automatic locking gear which has to be released to allow the wagon to start, and a key fitted to an ordinary hydraulic cock on the pipe-line connecting the two hydraulic cylinders—the speed of tipping being varied by the opening of the cock.

The two cylinders and piping were taken from the discarded retort-discharger, and the whole of the machine was designed and constructed by the gas-works staff. It has been in operation for more than three years, during which period it has discharged over 100, 000 tons of coal without a hitch; and whereas formerly the two telpher trolleys were more than sufficient to deal with the coal discharged by hand from the wagons, now the latter have to wait until the telpher clears the pit.

The machine offers several advantages over existing tippers. It can be installed where neither steam nor electricity is available, and its first cost is considerably cheaper than the ordinary hydraulic type, as no hydraulic compression is required. Its operation is very simple, and the cost of upkeep negligible, as the number of working parts is reduced to a minimum, and there is practically nothing to get out of order.

Although the actual machine was designed for side discharge wagons, it is equally applicable to end discharge; and by a suitable division of the accumulator, trucks of varying weight and capacity can be dealt with.

To provide for leakage from the cylinders should this occur, a simple hand-pump is fitted in a small box at the side of the pipe-line to which it is connected by a T piece with a valve.

[The machine has been patented, and steps are being taken to place it on the market.]

Heating Martin Furnaces with Cold Coke-Gas.—Experiments with cold coke-oven gas as fuel for a 30-ton Martin furnace were, says "Engineering," begun at the Eisen-und-Stahlwerk Hoesch in 1913; and the fuel was in 1914 adopted for their new 100-ton furnaces of the enlarged open-hearth plant. The gas arrives, in 700 mm. pipes, from the coke-ovens cold and saturated with moisture. It was first introduced into the furnace through a square brick tuyere, which was advantageously replaced by water-cooled wrought-iron tuyeres, 120 mm. diameter. The latter last a number of heats, and are exchangeable within half-an-hour. There was some trouble at first with explosions—especially after shutting-down—caused by the hot air and gases from the furnace entering the mouth of the pipe, the gas not being under pressure. This trouble was cured by a reconstruction of the valves. The gas contains little sulphur and a great deal of hydrogen, both advantageous features. When, however, the calorific value of the gas decreased, mainly owing to the dearth of coal and to labour trouble, the material economical advantages of its use vanished, and experiments are now in progress on preheating and enriching the gas.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

An Afternoon Spent at Windsor.

There was a strong turn-out on Saturday, for the summer meeting of the Association; a party of 110 (including a number of ladies) assembling at Windsor in the afternoon—attracted by a programme the promise of which was amply fulfilled in the performance. These summer meetings are arranged with a view to combining business and pleasure; and this was most successfully accomplished on Saturday. Windsor possesses natural and other advantages which render a visit almost necessarily a pleasure, wander where one may; but when in charge of genial and well-versed guides, the enjoyment to be derived must be infinitely greater. This was the case of the members of the Association and their friends, who one and all felt—and rightly so—that for much of the success of the visit their thanks were due to Mr. Herbert Buckley, the Engineer and Manager of the Windsor Royal Gas Light Company. With Mr. Buckley and his Assistant, Mr. J. Abbot, awaiting them on arrival, and at once taking them in hand, no straying from the straight path (up to the Castle) was possible, and the time available was spent to the best advantage. But not content with placing his own store of local knowledge at the disposal of his visitors, Mr. Buckley called to his aid a willing helper in the person of Mr. R. B. Robertson (the Resident Architect of the Castle), who had it in his power to satisfy pardonable curiosity to a somewhat greater extent than would otherwise have been permissible. Windsor is not far from London; but many of the party found themselves for the first time in the Castle. So that even this portion of the proceedings possessed its instructive side. The State Apartments were visited, then the Round Tower, the Albert Memorial Chapel, St. George's Chapel, and the East Terrace.

Afterwards, the party were the guests of the Gas Company at tea—Mr. Buckley occupying the chair. Mr. S. B. Chandler (the President of the Association) declared that the meeting had been an unqualified success, and certainly one of the most enjoyable that they had had. The visit to the Castle had been very well organized by Mr. Buckley, who, with Mr. Robertson, had earned their gratitude. On the present occasion, it had been found necessary to reverse the usual order of things, and to reserve the "business" part of the proceedings until the last. On rising from the tables, they would proceed to the gas-works, which must be one of the oldest undertakings in the country, as they were built only a very few years after gas was first used commercially. Mr. F. J. Pearce (the new President) proposed, Mr. F. S. Larkin seconded, and the visitors warmly accorded, a very hearty vote of thanks to Mr. Buckley, the Directors of the Gas Company, and Mr. Robertson, for the great kindness and hospitality that had been extended to them that day. Mr. Buckley, in response, said it had been a real pleasure both to the Directors and to himself to do all they could to make the visit a success. Mr. Robertson also declared that he had been only too glad to do any little thing he could to add to the enjoyment of the meeting.

An hour was then spent on an inspection of the gas-works, which are alongside the Great Western Railway. The original works were built as long ago as 1825; the proprietors for some time making gas from wood and resin, as they considered it was both a purer and a better gas than that obtained from coal. However, owing to numerous difficulties which arose, this was in a very short time given up; and gas making from coal commenced in 1827. Under Mr. Buckley's supervision, gas is still manufactured and purified on the same site; additional land, on the other side of the main road, having been acquired for storage

purposes. Going back twenty years, when the annual make of gas was 88 million c.ft., the works contained two retort-houses—twelve beds in one, and eleven in the other, all direct fired. During the winter of 1900, considerable difficulty was experienced in maintaining an efficient supply of gas; and the Directors therefore decided to instal regenerator settings in No. 1 house. Eight beds of eights were built; and three years later five beds were put in No. 2 house.

Seeing that, with the active pushing of slot-meters, the consumption has doubled since 1900 [in 1919, the make was 170 million c.ft.], it is not surprising to find that twelve months ago the Board decided to put-up a new retort-house, which has now been in operation about six months, and everything is working satisfactorily. No. 2 retort-house and coal-stores were pulled down, and a stage-floor house was built, with six settings of eights, 18 ft. long, served by a Guest-Gibbons electrical stoking machine. The generator-house contains a 35 KW. set, with a vertical steam-engine, and is situated at one end of the retort-house. The Great Western Railway being built upon a viaduct by the side of the works, three of the arches are used as coal-stores; the coal breaker and elevator being in the centre one. The coal, on being unloaded from side-door wagons on the railway, merely drops through a hold down into the store. After being broken, it is elevated to an overhead bunker which will contain 48 hours' supply. Two of the three holders are spiral-guided; and adjoining them are the stores, fitters' and smiths' shops, and sulphate of ammonia plant.

Association of Technical Gas Officials.

A Special Meeting of the Association was held at the Westminster Technical Institute on Friday, to hear a statement by Mr. W. M. Valon, of Stafford, on the objects and aims of the recently-formed National Association of Technical Gas Officials. There was a good attendance.

The President (Mr. S. B. Chandler), who was in the chair, explained, in introducing the speaker, the circumstances leading-up to the meeting, and asked the members to consider carefully the points raised, and, if any doubts existed, not to hesitate to ask questions.

Mr. Valon gave particulars as to the Association, following closely the remarks he had made at the first annual meeting on June 2 at the Institution of Mechanical Engineers [*ante*, p. 655]. He suggested that the industry stands in need of the Association, if it is desired that many anomalies now existing should not in future recur. The main object of the Association is not increase of salary without technical ability, but rather an uplifting of the status of technical men—to secure a greater recognition of their worth, and to ensure that positions of responsibility shall be filled only by those possessing the necessary technical and educational qualifications. It is not intended to incorporate in the constitution trade union elements as they are known to-day. Though the draft rules upon which the Association has been formed may possibly be amended, this can only be done subject to the wishes of the various District Committees; and no rules would undergo alteration unless by a majority vote of the members. The Association in no way desires to come into conflict with those controlling the industry, but in the main wishes to raise the position of the technical official to a much higher plane than at present, having regard to his importance generally. It is essential for the success of the Association that support be given by the South; and he advised all those desirous of joining, and in doubt as to the wisdom and correctness of their action, to obtain the sanction of their chiefs before doing so. The Secretary would be pleased to send on full particulars to those making application.

A lengthy discussion followed, and many questions were asked and answered. The Chairman, in bringing the discussion to a close, said that the matter was one of great importance; and after the statement they had heard, it was for them as individuals to consider what action they would take. Future needs in the industry demand a higher degree of technical education—a matter with which the Junior Associations are having much to do—and proof of ability; and accordingly it is necessary that only men so fitted be permitted to occupy these positions. Any steps to be taken would depend upon the strength of the Association; and members must themselves decide their attitude. After all, while everyone desired that merit and ability should be the chief factors in deciding a man's fitness for a position, there might be cases, and probably are, in which this has not been particularly well considered. If the new Association can, by its organization and schemes, assist in this matter, and will keep away from any ill-considered or drastic action, and the exercise of any power it may possess in a harmful manner, then it would apparently justify itself, and prove of value to those who wish to qualify for and fill responsible posts in the future. But each member must judge for himself what position he will adopt in relation to the Association.

On the proposition of Mr. F. J. Pearce, seconded by Mr. L. E. Wellard, Mr. Valon was very heartily thanked for his attendance and explanation.

Mr. E. M. Beecham, for 28 years Manager to the Cirencester Gas Company, Ltd., died on the 18th inst., at the age of 65 years. He had not enjoyed good health for the past eighteen months, and had undergone two operations. Mr. Beecham was a member of the Institution of Gas Engineers.

LOW TEMPERATURE DISTILLATION OF SUB-BITUMINOUS COAL.

By H. K. BENSON and R. E. CANFIELD, of the Laboratory of Industrial Chemistry, University of Washington.

[From the "Journal of Industrial and Engineering Chemistry."]

The results obtained from the low-temperature distillation of a non-commercial lignite coal in the State of Washington appeared of sufficient value to warrant some further investigation on a semi-commercial scale. Such work is now under way, with somewhat different apparatus, on another lignite coal. In connection with the mining of sub-bituminous coals, it has frequently been found unprofitable to work certain veins, on account of their high ash-content or other unmerchantable properties. For instance, the Bagley vein at Coal Creek, Newcastle, U.S.A., is described as being "too dirty" for the production of a commercial fuel, and although of sufficient size, is not worked. It seemed of interest, therefore, to ascertain the suitability of this material for distillation purposes.

DESCRIPTION OF SAMPLE.

The coal is black in colour; but the streak is brown-black as the powder shades off to brown. It has a rather dull lustre, is massive in texture, without joints, and has a conchoidal fracture. The proximate analysis is given in Table I.

TABLE I.—*Proximate Analysis of Newcastle Coal (Per Cent.).*

	Laboratory, as Received.	Sample, Air-Dried.	Sample Reported U.S. Geological Survey.	
			As Received.	Air-Dried.
Moisture	12·1	5·8	7·1	5·9
Volatiles	36·8	39·4	37·8	38·1
Fixed carbon	40·7	43·6	42·9	43·1
Ash	10·41	11·15	12·2	12·9
Sulphur	0·34	0·36	0·34	0·38
Nitrogen	1·37	1·47	2·44	2·61
B.Th.U.	10410·0	11150·0	10410·0	11300·0

PRODUCTS AND DISTILLATION.

The yield of raw products at the different distillation temperatures is given in Table II.

TABLE II.—*Yield of Distillation Products.*

Temperature °C.	Total Distillate.	Dry Tar.	Aqueous Solution.	Coke.	Gas C.Ft. Per Ton.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	
150	6·9	—	6·9	90·2	3
200	9·2	0·5	8·7	85·1	8
250	17·1	1·9	15·2	74·1	22
300	18·3	2·8	15·5	70·6	2070
350	19·8	3·5	16·3	67·2	3540
400	18·9	3·2	15·7	66·1	4850
450	18·7	2·8	15·9	65·3	5990
500	17·7	2·3	15·4	64·2	6910
550	17·1	1·6	15·5	63·1	7670
600	16·1	1·0	15·1	62·2	8310

GAS.

A wet test-meter was used for measuring the gas—the yields being indicated in Fig. I. The gas samples were analyzed in a Morehead gas apparatus; and the percentage composition is given in Table III.

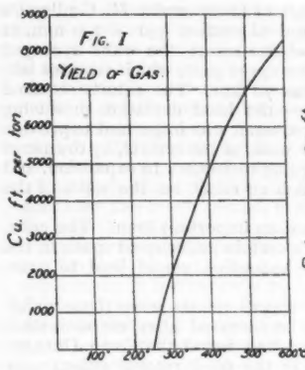
TABLE III.—*Percentage Composition of Gases.*

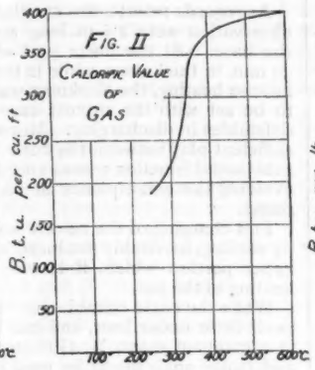
°C.	CO_2.	Ill.	O_2.	CO.	H_2.	CH_4.	N_2.
250	45·1	3·3	1·4	7·1	0·3	8·6	34·2
300	33·2	3·8	0·8	8·3	0·9	10·7	42·3
350	20·4	4·9	0·4	9·6	8·1	23·6	33·0
400	18·9	5·0	0·4	11·8	9·8	21·2	32·9
450	17·3	4·9	0·4	13·3	11·5	20·2	32·4
500	16·4	5·1	0·4	14·5	13·0	18·4	32·2
550	14·1	5·1	0·4	15·6	15·1	17·8	31·0
600	12·6	5·3	0·4	16·8	15·9	17·2	31·8

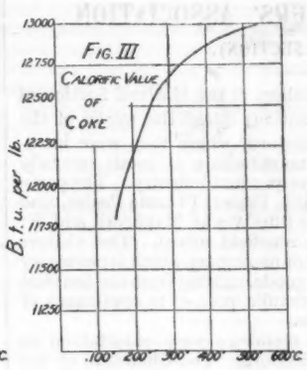
The calorific values, calculated by Lunge's method, are plotted against the temperatures of distillation in Fig. II.

COKE RESIDUE.

The coke obtained up to 500° C. was of a dull black colour, and retained more or less the size and form or the original particles. From this point to 600° C., the particles possessed more of a metallic or silvery lustre, and swelled slightly in size. Its composition is given in Table IV., which also shows the yields per ton of coal. In Fig. III. is shown the increase in calorific value with increase of temperature. The thermal values of the coke were obtained by means of the Emerson bomb calorimeter.







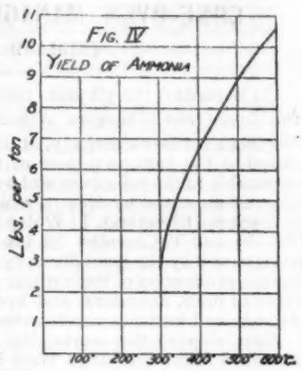


TABLE IV.—*Yield and Composition of Coke.*

Temp. °C.	Coke. Lbs.	Volatiles. Per Cent.	Ash. Per Cent.	Nitrogen. Per Cent.	B.Th.U.
150	1804	38·0	14·3	2·9	11,800
200	1702	31·8	15·1	2·7	12,210
250	1482	26·7	17·5	2·5	12,500
300	1412	22·5	18·2	1·8	12,690
350	1344	19·4	19·3	1·4	12,790
400	1322	16·2	19·5	1·1	12,870
450	1306	13·1	19·9	0·9	12,930
500	1284	9·9	20·1	0·7	12,980
550	1262	6·8	20·4	0·6	13,020
600	1244	4·1	20·7	0·5	13,040

AMMONIACAL LIQUOR AND CYANIDES.

The total distillate was well washed, and the washings tested for ammonia and cyanides. Most of the ammonia was found to be held by the tar before it reached the acid wash-bottle; while the cyanogen content seemed to be nearly all carried over to its respective wash-bottle. The cyanide precipitated-out upon the addition of ferric alum even at the lower temperatures. As this precipitate was intermixed with impurities, as noted by the colour, no significance would attach to the amounts obtained at the various temperatures; but it was estimated that approximately 1·25 lbs. of cyanogen may be obtained at 600° C. per ton of coal. The yield of ammonium sulphate in pounds per ton of coal is given in Fig. IV.

TAR OILS.

All the water was extracted by calcium chloride from the crude distillate, and the dry tar obtained was red-brown in colour and semi-solid at ordinary temperatures. Its specific gravity ranged from ·975 to 1·033. The oils were distilled in small glass retorts, and the percentage yields are given in Table V., including the hard and soft paraffin separated by a modification of Eisenlohr's method. About half-a-gram of the paraffin oil was weighed to the nearest milligram in a tared 7-in. test-tube and warmed slightly.

TABLE V.—*Percentage Composition of Oils.*

Temp. ° C.	To 150° C. Light Oil.	150° to 300° C. Medium Oil.	Above 300° C. Paraffin Oil.	Hard Paraffin.	Soft Paraffin.	Coke.	Loss.
250	10·3	42·1	33·1	3·9	1·3	9·6	4·3
300	10·7	42·5	33·4	5·0	1·8	10·0	3·3
350	11·3	41·9	33·9	5·5	2·1	9·7	3·2
400	10·5	41·7	33·2	5·2	1·9	10·3	4·3
450	9·3	41·4	31·4	3·4	1·5	13·6	4·3
500	7·8	41·5	39·8	2·1	1·4	15·9	5·0
550	5·9	41·2	29·2	0·9	0·7	17·6	5·9
600	3·9	40·9	27·8	0·6	0·5	21·1	6·3

TABLE VI.—*Yield of Oils in Pounds per Ton of Coal.*

Temp. ° C.	Raw Tar.	Light Oil.	Medium Oil.	Paraffin Oil.	Hard Paraffin.	Soft Paraffin.
250	38	3·9	16·0	12·6	1·5	0·5
300	56	6·0	23·8	18·7	2·8	1·0
350	70	7·9	29·3	23·7	3·8	1·5
400	64	6·7	26·7	21·2	3·3	1·2
450	56	5·2	23·2	17·6	1·9	0·8
500	46	3·6	19·1	13·7	1·0	0·6
550	32	1·9	13·2	9·3	0·3	0·2
600	20	0·8	8·2	5·6	0·1	0·1

Then 20 cc. each of ethyl ether and ethyl alcohol were added and the mixture cooled to −20° C. in a salt and ice bath. The flaky mass was filtered through a 4-in. funnel surrounded by freezing mixture; the filtrate being evaporated, and the soft paraffin determined by freezing from an ether-alcohol (1 : 2) mixture after evaporating upon the water bath. Any admixture of impurities was removed by dissolving the paraffin in the filter, by pouring boiling ethyl alcohol through it and collecting the filtrate in a tared beaker, the alcohol evaporated, and the hard paraffin (melting point, 45° to 55° C.) weighed.

PROPERTIES OF TAR OILS.

The light oils were washed with sodium hydroxide and sulphuric acid; 20 p.ct. being soluble in alkali. The washed oils were then treated with concentrated nitric and sulphuric acids in a reflux condenser, whereupon nitro derivatives were obtained to some extent; but the limited amount of oils secured made it impracticable to ascertain the yield. Phenols also were isolated upon the addition of bromine water to the cresols obtained from the alkali washings. The specific gravities of the various fractions are recorded in Table VII.

TABLE VII.—*Specific Gravity of Tar Fractions.*

Temp. °C.	Light Oil.	Medium Oil.	Paraffin Oil.
250	0·807	0·905	0·939
300	0·815	0·908	0·950
350	0·812	0·915	0·957
400	0·815	0·926	0·968
450	0·816	0·935	0·966
500	0·816	0·938	0·978
550	0·818	0·946	0·983
600	0·821	0·955	0·985

DISCUSSION.

The most striking feature of the investigation is the well-defined decomposition point between 350° and 400° C. It approximated closely to the same temperature as in the previous study—viz., 380° C. This marks a maximum yield of tar oils, and an abrupt rise in the quantities of hydrogen and methane; the change of composition in the gas being evident from the shape of the curve (Fig. II.). At this point also occurs a decrease in paraffins, suggesting the possibility of the cracking of the oils.

Unlike the previous study, the presence of cyclic compounds in the light oil was proved by the formation of nitro derivatives and phenols. The light oils were distilled, and small amounts of benzene (to 95° C.) and toluene (95° to 120° C.), as well as a considerable amount of solvent naphtha (128° to 200° C.) were recovered. The light oils soluble in sodium hydroxide constitute the cresols and unsaturated acids. The medium oil is made up in part of naphthalene, anthracene, and the higher paraffins. It is semi-solid at ordinary temperatures. Soft pitch is contained only in tars obtained at 500° C. and above.

CONCLUSIONS.

1. The maximum yield of tar-oils is obtained at 350° C.
2. About 3·5 p.ct. of the coal may be obtained as raw oils.
3. These raw oils are the mixture of coal tar and petroleum-like oil, with the former predominating.
4. The yield of light oils decreases rapidly as the temperature increases, that of the paraffin oils less rapidly; while the yield of the medium oils remains fairly constant.
5. About 5·3 lbs. of paraffin wax per ton of coal may be obtained at 350° C.
6. The gas given off up to 600° C is small in volume and low in heat value, but relatively high in illuminants.
7. Appreciable amounts of ammonia may be obtained from the tar water, and also small amounts of cyanides.
8. The specific gravities of the tar-oils and their respective fractions increase correspondingly with an increase in the temperature of distillation.
9. This coal, when subjected to destructive distillation, has a temperature of marked decomposition which corresponds to a sudden increase in the amounts of hydrogen and methane evolved, and a corresponding increase in the quantity of oil distilled, which is generally the maximum point, and (as in most low-grade coal) this temperature lies between 350° and 450° C.
10. The residue at 350° has a calorific value of 12,790 B.Th.U., which is an increase of 22·8 p.ct. over the coal as mined, and of 14·7 p.ct. over the dry coal.

His Royal Highness Prince Henry recently held an investiture at the Armstrong College, Newcastle,; and among those to receive their decorations was Major F. J. Bywater, R.E., who was the recipient of the Military Cross with bar.

COKE-OVEN MANAGERS' ASSOCIATION

(MIDLAND SECTION).

On Saturday, the 5th inst., members of the Midland Section of the Coke-Oven Managers' Association visited the works of the Northern Rubber Company, at Retford, where they were introduced to the various phases of manufacture of goods specially applicable to the coke-oven and bye-product industry. The party were taken round by Messrs. Frank Pegler, Francis Pegler, and B. Fenton (Directors), T. Watson (the Works Manager), and W. Whitby and T. Chandler (of the Sheffield office). The visitors were struck by the great diversity of machinery which is necessary for the production of the various goods, ranging from the heaviest types of mills, calendars, and hydraulic presses to appliances of delicate and intricate construction.

After viewing the works, the members were entertained at luncheon at the Exchange Hall, Retford. The Chairman of the Section (Mr. J. A. Davy, of Crigglestone), after congratulating the President of the Association (Mr. J. W. Lee) on his recovery from his recent illness, called on him to propose a vote of thanks to the Northern Rubber Company. Mr. Lee, in doing so, made many complimentary remarks with reference to the Directors and staff of the Company, and expressed his appreciation of the great amount of research work which had been carried out by them in order to meet the various difficult requirements of the industry. Mr. T. B. Smith (Secretary), seconding, said he was sure the visit would be extremely valuable to the members, since now that they knew the various processes it would be considerably easier to specify the type of material most suitable to their requirements. The Chairman of the Company (Mr. Pegler) replied, and stated that the works were established in 1871, and rank among the oldest of their kind in the country. The result of their long experience is that to-day their mechanical goods are favourably known to almost every coke-oven works and colliery throughout the kingdom.

In the afternoon the visitors were hospitably entertained at Ordsall Hall, the residence of Mr. Pegler, where tea was afterwards provided.

VERTICAL RETORTS IN SMALL GAS-WORKS.

By M. GUILLEMÉ.

[A Paper read before the Société Technique du Gaz.]

M. Guillemé explained that his communication was written with the object of showing that the system of vertical retorts was deserving of the attention of managers of quite small works, as well as of those of the large establishments. In speaking of a "small" works he had in mind one carbonizing about 3000 kilos. of coal per twenty-four hours for a make of 1000 to 1200 cb.m. of gas—certainly a small works, yet not the smallest in which the employment of vertical retorts was of service. In an actual works the installation consisted of a bench of eight vertical retorts; but the number could be reduced to six or four without appreciable difference in the results. The works to which he referred were established in 1907, and had used vertical retorts from the beginning. He was therefore able to refer to what had been actually accomplished. A further recommendation of the vertical retort was its applicability to the production of water gas—affording the most ready means of producing a mixed gas, and not necessarily involving the use of a carburettor.

But as regards the dry distillation of coal, M. Guillemé expressed the view that vertical retorts possessed positive superiority over those laid horizontally in respect of the special circumstances of a small undertaking; and he was of this view notwithstanding the improved results from horizontal retorts which had been obtained during the past few years. The advantages of vertical retorts were realized in the greater yield of gas, its better quality, economy of labour, longer life of the retorts and furnaces, and, again, the production of water gas.

A good feature of the vertical plant was its erection on the ground level, eliminating the troubles which occurred in districts liable to percolation of water through the subsoil. For a bench of eight retorts, the front surface would run to a length of about 3·5 m., the side to 5·3 m., and the height to about 5 m.

A feature of present-day conditions which required to be kept in mind was the smaller consumption of gas in many places. A small works which formerly distributed 1200 cb.m. would now supply not more than 900 to 1000 cb.m. If water gas was made, the distillation of coal could be proportionately reduced; and the eight retorts necessary for normal working at full production would not be required. In these circumstances, there was the occasion to study the arrangement of retorts in separate groups, independent in working, but heated by a single furnace. These groups of four or even two retorts had their respective recuperators brought into action by the simple operation of dampers forming part of the furnace. The gas producer of these furnaces was arranged so that its consumption was in correspondence with the number of retorts in working, as could be done with great readiness. The vertical retort was susceptible to this system, the use of which was an important item in the economy of small works.

As regards retorts, the smallest of those under M. Guillemé's observation were 2·8 m. long and of section 390 × 290 mm. at the base. At the lower part of the retort, the walls averaged 90 mm. in thickness; while in the upper part, which receives less intense heating, the thickness was 70 mm. The retorts required to be set with the utmost care—the least deviation producing difficulties in discharging. Moreover, it was important to provide sufficient play between the outer walls of the retorts, by the use of substantial junction-pieces affording resistance to expansion, and avoiding the consequence of such an effect on the walls of the retort.

Full charging of the retorts was an important item. The coke, by settling, inevitably produced a certain unoccupied space in the upper portion which, if it was excessive, would lead to overheating of the gas.

While the coals suitable for vertical retorts were those which swell little under heat, and can be removed after carbonization in a compact mass, M. Guillemé had found that both Durham and Bruay coals might be used in the small retorts without any difficulties in discharging. The small gas-maker at the present time could not be fastidious in his choice of coals. For retorts of 2·80 m. the normal charge was 175 kilos., and the period of carbonization ten hours. As there were no ascension pipes, but horizontal channels admitting directly to the hydraulic main, which was placed where it obtained ample ventilation, overheating of the tar was not a usual contingency.

The consumption of coke by the furnaces should average from 15 to 20 p.ct.—a proportion which would be greatly exceeded with coke of inferior quality, but might be reduced if using the best coke. M. Guillemé mentioned 21 to 22 p.ct. as the actual figure for a small works. The charging gear for the producer furnaces was arranged on the upper part of the structure. It consisted of a travelling carriage and a charging skip similar to those for the retorts.

As regards the operation of the furnaces, the mixing chamber for the gas and secondary air, owing to its position at the base of the retorts, produces a much more intensive heating at this part than in the higher portion containing the greater quantity of coal. A normal temperature in the lower part is about 1300° C., falling to 1100° C. higher up. This temperature once obtained should be kept constant, and frequently tested. Any subsequent alteration of the inlets of primary and secondary air should be made with the very greatest caution, since it would produce impulses of heat very injurious to the retorts. Unlike the furnaces ordinarily used for horizontal retorts, the vertical system has not the latitude in the way of intensifying carbonization and reducing the number of charges. The producer furnaces must be worked regularly for a carbonization time of about ten hours; otherwise the local expansion of the retorts will have very injurious effects. The time of carbonization may be prolonged by reducing the temperature; but as a rule it is preferable to keep the temperature normal.

In the use of vertical retorts, the course of carbonization has considerable effect upon the quality of the gas and the bye-products. The best conditions are those in which the gas escapes most rapidly from the walls of the exposed part of the retort which forms a region where its hydrocarbons are largely decomposed. Owing to the higher temperature of the lower part of the retort, and therefore of the coal contained in it, the latter undergoes distillation while that in the upper part is scarcely affected. In the course of the decomposition of the coal into a tarry mass which adheres to the sides of the retort, the gas—unable to find a ready passage towards the sides—tends to be disengaged in the centre of the charge, which is at a lower temperature and distils more slowly. Only after a considerable time, when the central portion has become carbonized and the outer portions completely reduced to coke, does the gas pass readily from the centre to the walls of the retort. At this stage it encounters the same kind of obstacle to its passage in the upper part; so that it is only during a short time towards the end of the charge, when coking is almost completed, that the gas traverses a superheated and relatively short region. During this latter period—owing to the absence of friction and pressure incidental to the use of horizontal retorts—the gas does not undergo decomposition of its hydrocarbons, and thus is produced in greater quantity and with a large proportion of lighting and heating constituents. The increase of yield in comparison with horizontal retorts and without the use of steam, is estimated by M. Guillemé at from 2 to 3 p.ct. The whole yield may be taken as about 33 p.ct. when using a low-pressure rotary exhauster on the hydraulic main, and with a temperature of 12° C. at the meter inlet.

The coke from vertical retorts is of better density—due partly to the settling of the mass of the charge and to the passage of the gas through the heated coal with consequent deposition of carbon. Also particles of heavy tar and pitch, under the influence of the heat of the coke, incorporate themselves with it, and contribute to yield a coke of such good density as 48 kilos.

As a consequence of the partial absorption of the heavier elements of the tar by the coke, the tar which is separately obtained from vertical retorts is of great fluidity and clearness and rich in middle oils. Moreover, the yield is greater than with horizontal retorts, averaging from 6 to 10 kilos. per 100 kilos. of coal.

A further characteristic of distillation in vertical retorts appears to be the small production of naphthalene, which may sometimes be almost entirely absent. Removal of carbon from the retorts is much less frequently required—viz., about every two or three

months. Little carbon is produced, and the current of air created through the retort when the charge is being withdrawn largely detaches particles of carbon which might otherwise accumulate on the surface of the walls.

A great point in favour of the system is the relatively small amount of manual labour which it involves. In discharging, two men are required—one on the upper stage of the structure, the other below. The former operates the upper cover of the retort, and gives the word to the latter, by whom the lower door is opened, so as to allow the coke to fall either in a single block or in pieces into the truck placed below. The lower door is then closed; and the workman above introduces a small quantity of coke dust or breeze—about sufficient to form a layer of 30 cm. in depth. On the charge having been delivered from the coal skip, the upper cover is hermetically sealed and distillation begins.

The charging of two retorts should be done in five minutes, and with scarcely any physical exertion. During distillation, one workman suffices to prepare the next charge, to supply the producer furnace with coke, and generally to look after the installation. As regards labour and output, the comparison between horizontal and vertical retorts may be made by saying that with the former one workman will produce 800 cb.m. of gas, while with the other he will produce 4000 cb.m. Although these may be considered theoretical figures, it cannot be questioned that the vertical plant is highly economical of labour.

Although a set of vertical retorts may be equipped with modern and electrical machinery, such as a small works could not think of purchasing, yet this part of the installation may be of a very simple character. A double charging skip may be mounted on a mono-rail, while a second skip serves for the charging of the producer furnace. A hopper in the upper part of the structure contains the coal, and is filled without very great labour by an ascending skip operated by a windlass. One workman in an hour or two will be able to raise the quantity of coal required for a charge.

As regards wear and tear, M. Guillemé reports as to several small works in which vertical retorts have been in continuous use for four years. Retorts which have had forty-eight or fifty months' service were still in use; while a plant which had been going for thirty-eight months worked as well as on its installation, and was expected to complete sixty or seventy months' service before requiring overhauling. Furnaces installed in 1907 and 1908 have not reached the limit of service expected from them.

In considering the use of vertical retorts for the partial generation of water gas, M. Guillemé emphasizes the facility which they provide in this respect without the cost of special and costly accessory plant. In the ordinary cost of working, a temperature of 1300° to 1400° C. is obtained in the furnace, readily giving a minimum of 1000° C. in the retort. This corresponds with the normal reaction represented by the equation:

$$C + H_2O = CO + H_2$$

and renders unnecessary any special means for the combustion of the carbon. M. Guillemé has ascertained that the introduction of steam into the retort does not involve any reduction of temperature in the mass of the charge when the admission is made under certain conditions, and when the proportion of steam does not exceed 20 to 25 p.ct. As regards carburation, he lays stress on the fact that the steam, when admitted during the period of carbonization, generates water gas which, as it is formed, takes up hydrocarbons from the coal gas, also penetrating the pores of the coke, and removing volatile products from it. A species of auto-carburation thus goes on, and in certain circumstances is sufficient. Where, however, it is found necessary to employ enrichment, the consumption of carburetting liquid is greatly reduced, to the extent of 40 to 50 p.ct.—an economy not to be despised in view of the present high cost of oils.

The admission of steam may be done on one or other of two systems. One consists in operating a jet of steam rapidly on the charge in the retort, which serves as a generator—the operation lasting only about ten or fifteen minutes, and the steam being used at an inlet pressure of 4 to 5 kilos. According to the second system, steam is admitted slowly and at the low pressure of 500 to 600 gms.; its admission in this case occupying several hours. Whichever system is adopted, the steam should not be admitted during the first period of distillation when the mass of the charge has not attained a sufficiently high temperature. Nor on the other hand should it be left to the end of the charge, when the production of hydrocarbons has died-down and the illuminating power of the gas will be seriously affected. For a time of distillation of ten hours the operation, according to the first system, should be carried out in the third or fourth hour, when hydrocarbons are being freely produced and are swept from the retort by the action of the steam. In working upon the latter (low pressure) system, the operation should be begun at about the fourth hour of distillation, and should end about an hour before the conclusion of the charge. Under these conditions, as shown by practice extending over several months, an average yield of mixed gas is 38 to 29 p.ct.

With auto-carburation the illuminating power is ample for use in open-flame burners. Tested with the Giroud apparatus, the height of the flame was 105 mm. with a consumption of 40 to 42 litres. As regards the poisonous properties of the gas, the mixture is by no means odourless, and any leakage is made evident just as it is with ordinary coal gas. Where the proportion of water gas in the mixture is that represented by the use of 20 to 25 p.ct. of steam, the percentage of carbon monoxide will be from 10 to 13—that is to say, appreciably below the 15 p.ct. tolerated on hygienic grounds as being without ill-effect. The calorific power ranges from 4700 to 4500 calories—a value that M. Guillemé considers best for gas to be burnt in gas cookers, incandescent burners, or radiators.

While admitting that the production of the mixed gas by the injection of steam may perhaps tax the resources of a small works to an inconvenient extent, M. Guillemé concludes by suggesting that the introduction of water, at the prevailing temperature, in the form of a fine spray which is instantly vaporized may serve for the production. The yield in such a case may be put at from 36 to 37 p.ct.; but it would be necessary to deliver the atomized water in correct quantitative proportion. This proportion ascertained, and means provided for supplying it, it is thought that such a modification of the process would yield satisfactory results in regular practice.

THE AUTOMATIC SUPPLY OF STEAM IN THE DISTILLATION OF AMMONIACAL LIQUORS.

By M. G. FRÈRE.

[A Paper read before the Société Technique du Gaz.]

In remarking on the advantage to small gas-works—those carbonizing from 1000 to 1200 tons of coal per annum—of distilling their own ammonia liquors, the author pointed out the necessity of reducing as far as possible the cost of labour in the operation. The intermittent attention required for the ordinary type of still is usually the chief item of labour; but this may be avoided by an automatic control of the steam supply. This can be done so satisfactorily as to call for attention only for a few moments every three or four hours, even when employing an open-fire boiler for the generation of the steam.

The subject was dealt with by M. Chevallet at the congress in 1910; but the arrangement described by M. Frère is put forward as simpler and more satisfactory in operation than that then described.

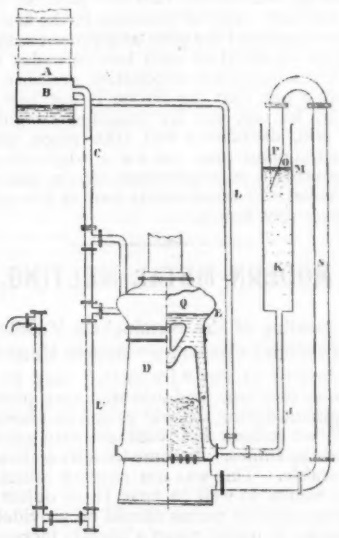


Fig. 1.

A. Still. B. Lower section of still. C. Steam inlet to still. D. Boiler. E. Level of water in boiler. L. Pipe conveying spent liquors to boiler. L^1. Outlet syphon of spent liquors. M. Normal level of water in reservoir K. N. Air inlet pipe to furnace. P. Angled extremity of N, the free opening of which is enlarged or contracted according to the variation of the steam pressure in Q.

Fig. 1 shows the arrangement when the source of the steam is a boiler, Q, supplied with fuel in the ordinary way, the object then being to produce the steam at the constant pressure required for the distillation. Under this pressure, which will be the same in B, the water in the boiler will rise to a corresponding height in the reservoir K, which is at its upper portion open to the atmosphere and connected to the boiler by the pipe J. A pipe P, the end of which is cut at an angle, is mounted so as to project downwards into this reservoir. Continued as the pipe N, it forms the channel by which a varying proportion of air is admitted to the fuel under the boiler.

When the pressure falls, the level of the liquid in the reservoir likewise falls—the pipe P then allowing a greater volume of air to reach the boiler furnace, and thus proportionately increase the generation of steam. Similarly, on the pressure becoming greater in Q, there is a corresponding partial closure of the pipe P, and thus a reduction of the air supply to the furnace.

When distillation is done by means of steam supplied to the still from an independent source under the pressure of a few kilos, a similar device may be used, as shown in fig. 2, for the automatic maintenance of constant pressure. In place of a valve in the

reservoir K, a fairly heavy float, F, is used, and has attached to it a flexible metal cable with a counterweight at its other end. This cable, in correspondence with the movements of the float, operates

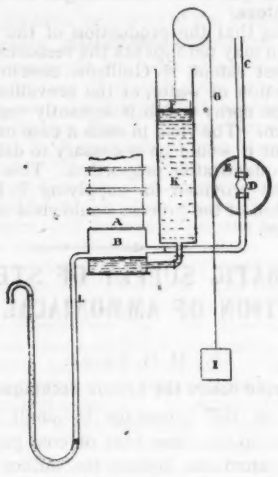


Fig. 2.

A. Still. B. Lower section of still. C. Steam inlet to still. D. Steam cock controlling inlet to still. E. Pulley controlling the cock D by the cable G. F. Float with cable attached. I. Counterweight. L. Outlet syphon of spent liquor.

a special cock D, uncovering at each successive stage of its opening a series of small holes which allow the steam to pass. This can take place under any pressure, since the cock regulates the volume of the steam according to the heat required for the operation of the still.

It will be readily understood that the position of the float in the reservoir will vary with the pressure in the first section of the still; and as the opening of the cock undergoes the same variations, the steam will be admitted at each instant under the conditions required for the maintenance of constant pressure.

While pointing out that the device is not new, M. Frère emphasizes that by its use, and by ensuring a regular delivery of liquor to the still, distillation will take place with such great regularity that the plant may run for a whole day without any attention when using a separate steam supply, and when employing a fuel-fed boiler will require only four or five charges of fuel during the twenty-four hours.

MODERN METAL MELTING.

At a recent meeting of the Birmingham Metallurgical Society (the last of the session) a paper on "Modern Metal Melting" was, as already intimated in the "JOURNAL," read by Mr. A. J. G. Smout. Gaseous fuel was undoubtedly very popular, he said, and its development during the war period had been great. There were, however, two serious disadvantages with gas-fired furnaces —the noise and the fumes. In some foundries, these defects were well-nigh intolerable. This was not carping criticism; and furnace designers would do well to bear these objections in mind. As to the fumes, suitable means should be provided for their removal, even though it might mean a slightly increased consumption of gas.

With regard to noise, he suggested that the future of gas-firing lay with the use of low-pressure burners, and that the compressing of either the gas or the air was a step in the wrong direction. Such a change would also be accompanied by less wear on the furnace refractories, which were often severely tried by flames of very high velocity. The absorption of the gas from a gas-fired furnace by the molten metal was another important point, upon which much further information was necessary. Molten metal, unlike water and other fluids, absorbed an increasing quantity of gas as the temperature rose; and all engaged in the production of high-grade alloys knew how difficult it was to prevent this absorption. A case came to his knowledge twelve months ago, where a firm in the North were experiencing the greatest difficulty in complying with the Admiralty specification for gun metal when casting from their new gas-furnaces, though still getting good results on their coke battery. Microscopic examination disclosed the fact that the trouble was due to occluded gas and oxide inclusions.

Mr. Smout said that he had recently raised the question as to whether we were really on the right lines in converting coal into town gas, and subsequently burning the gas in the ordinary crucible gas-fired furnace. He had in mind not only firing by pulverized coal, but the use of producer gas or either a regenerative or recuperative system. As to tilting furnaces, any class of fuel might be used; and from the point of view of heat efficiency, there was not much to choose between pulverized coal, coke, town gas, or oil, if the best furnace was selected for each fuel. An authority on the subject had provided him with the following figures as to the heat efficiencies of tilting furnaces for general all-round work: Coke, 15 p.ct.; pulverized coal, 15 p.ct.; town gas (550 B.Th.U.), 15 p.ct.; producer gas, 10 p.ct.; and oil, 14 p.ct. An essential feature of one type of tilting furnace was the pre-heater section, containing a muffle ring, which fitted closely into the crucible, and in which was placed bulky and light scrap. It also served to prevent the furnace gases from coming in contact with the contents of the crucible. Such furnaces were quite readily adapted so that they could be fired by town gas, producer gas, blue water gas, or oil. Producer gas (160 B.Th.U.) and water gas (310 B.Th.U.) could be quite successfully used in these furnaces, when properly-designed burners were employed. In fact, a very large metal-melting installation in the South of England was running on blue water gas for some years during the war.

POROSITY AND VOLUME CHANGES OF FIRE-BRICKS.

In Technological Paper No. 159 of the United States Bureau of Standards, Mr. George A. Loomis deals with the permanent changes in porosity and volume of clay fire-bricks when reburned to temperatures at or above those to which they were originally fired. The following abstract is from the "Technical Review."

The bricks were measured for a series of temperatures to determine what relation if any might exist between these changes and the deformation of the same bricks under load at furnace temperatures. The possibility of such a relation is suggested by the fact that contraction of clay on heating and decrease in porosity are, to a certain extent, indications of the amount of softening of the mass due to the action of fluxes present, and hence indicative of decreased resistance to deformation under pressure or decreased viscosity. Softening-point determinations were also made to determine what relation these might bear to the results of the load test.

The results of tests on a large number of clay fire-bricks from various parts of the country show that bricks which withstand a load test of 40 lbs. per sq. in. at 1350° C. without marked deformation show no marked changes in porosity or volume up to 1425° C. Bricks which do not withstand the test generally show appreciable contraction or expansion, accompanied by considerable decrease in porosity. Bricks which showed overburning and the development of vesicular structure below 1425° C. by marked expansion or increase in porosity, invariably failed under load. In general, bricks which show a decrease in porosity exceeding 5 p.ct. or a volume change exceeding 3 p.ct. (amounting to approximately 1 p.ct. in linear dimensions), when re-fired to 1400° C. fail to pass the load test.

No definite relation could be determined between the softening-point of a brick and its ability to withstand pressure at high temperature. All bricks softening below Cone 28 completely failed in the load test. Some showed quite high-softening points also failed—probably due to the use of an inferior bond clay in the mixture, or too small an amount of bonding material.

Gas Used for Galvanizing.

What is believed to be the largest gas-fired galvanizing installation in the United States has been erected at the Union Iron-Works, San Francisco. Describing it in the "Gas Record," Mr. H. M. Crawford, Industrial Gas Engineer to the Pacific Gas and Electric Company, says the first pot was 26 ft. long, 6ft. 10 in. deep, and 26 in. wide at the top, shaped something like the letter V, and containing 50 tons of zinc. It was set on piers, braced by cast-iron struts running from the floor-line to the lip of the pot. An 8-in. wall of fire-brick formed a rectangular box round the pot. Flames from 26 blast-burners, 13 each side, were projected through holes in the walls, in a downward direction, pointing towards the base of the pot, and into a bed of broken fire-brick. The jets were staggered, so that each flame would pass the opposite one, and not be opposed in its path down the side of the pot and across the bottom. The burners were designed to give a flat fan-shaped flame, following the contour of the pot, but not impinging on the metal. The furnace was specially designed for galvanizing ¼-in. to ½-in. ship-plates. The metal must be kept as close as possible to 800° Fahr. If a succession of heavy plates are to be dipped, the metal chills rapidly, and all the burners are turned on to maintain the proper temperature; while if ¼ in. plate is dipped, the load can be carried on ten burners. The flexibility of heat-control proves gas to be superior to all other fuels. As the pots are 1⅛ in. thick, and weigh many tons, it is no small matter to replace them. One pot at the Union Iron-Works has been in constant operation for thirty months, and gives evidence of continued useful life. The quantity of waste metal or dross is, from a financial point of view, of extreme importance. In some of the galvanizing plants, the dross runs to 20 p.ct. with an oil-furnace; while with gas it is less than 10 p.ct. The results of the original installation have been so satisfactory that two more 50-ton pots and one 15-ton pot have been added. The gas consumption, of course, varies with the demand made on the pot. With a ten-hour working shift, from 42,000 to 50,000 c.ft. per 24-hour day is an average.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Mr. George Helps and Thermal Efficiency.

SIR,—I have pleasure to forward for publication a copy of a letter which I have addressed to the Editor of "Gas," Nuneaton. The letter explains itself.

DUGALD CLERK.

June 25, 1920.

[ENCLOSURE.]

57 & 58, Lincoln's Inn Fields,
June 25, 1920.

The Editor, "Gas," Nuneaton.

Sir,—In your editorials which appear weekly in the enterprising Nuneaton journal "Gas," you generally agree with the views of the energetic gas engineer, Mr. George Helps. I am accordingly somewhat surprised to read your leader of June 16, and find that you strongly condemn the method of calculating the thermal efficiency of gas generation by means of the ordinary process of carbonization, which was used by Mr. Helps in his British Patent Specification No. 111,495, entitled "Improvements relating to the Manufacture, Utilization, and Combustion of Fuel."

Mr. Helps deals with the thermal efficiency of "straight" coal gas on p. 5 of the specification as follows:

PRESENT GAS-WORKS PRACTICE.

CARBONIZING COAL—COKE MAKING.

Coal carbonized—15 tons.
Quality—Good dry coal, very little dirt or ash.

				B.Th.U.
			15 tons of coal at 30,000,000 B.Th.U. per ton . . =	450,000,000
			Result of carbonizing.	
Tons.	Cwt.	Qrs.		B.Th.U.
2	10	0	150,000 c.ft. of straight coal gas of 600 B.Th.U.	90,000,000
10	17	2	Coke—11¼ cwt. per ton for sale 172½ cwt. of 13,850 B.Th.U. per lb. (dry coke) 3 cwt. per ton being used for carbonizing . .	267,600,000
	15	0	Tar—10 gallons = 1-20th of a ton on 15 tons 15 cwt. at 13,850 B.Th.U. per lb.	23,300,000
	15	0	Liquor—105 lbs. per ton: 105 × 15 = say, 15 cwt..	—
	2	2	Differences—Impurities removed in purifiers, washers, &c., and ash .	—
				380,900,000
			Loss by difference	69,100,000
15	0	0		450,000,000

Analysis of loss—

336 lbs. of coke used in fires . .	—
336 at 13,850 B.Th.U. per lb. . .	69,800,000
say,	70,000,000

SUMMARY.

70,000,000 B.Th.U. out of 160,000,000—*i.e.*, 70,000,000 + 90,000,000—have been expended to get a gas containing 90,000,000 B.Th.U., and therefore 44 p.ct. has been lost and the efficiency of the process is 56 p.ct.

Mr. Helps calculates the thermal efficiency of gas making as 56 p.ct. by a method which is quite correct. It is the only method which could be used by an instructed scientific man on the assumption that the gas has to bear the whole heat loss of the process. I used the same method in calculations made at the end of 1918, though not then aware of Mr. Helps's publication. You correctly state the equation as:

$$\text{Thermal efficiency of gas generation} = \frac{\text{Heat units in gas}}{\text{Heat units in gas + heat units expended and lost in manufacture of gas.}}$$

Mr. Helps calculates the thermal efficiency of gas generation in the instance chosen by him as 56 p.ct.; and my calculation as to gas generation by the Gas Light and Coke Company is correctly quoted by you as 47·8 p.ct.

You are quite in error in designating the formula as arbitrary. You make many interesting, but quite fallacious, calculations in the remainder of your article, which I may deal with later.

My present purpose, however, is to ask you to oblige me by giving me information as to Mr. George Helps's present views. Does he agree with your article, or does he adhere to the method used by him in explaining the carbonizing process in his specification of 1917, No. 111,495?

As I find from the "Electrical Times and Lighting" that you courteously supplied them with advance copies of your article before publication, I am following your courteous practice, and am posting copies of this letter to other gas journals and electrical journals.

(Signed) DUGALD CLERK.

Employers' Liability Insurance.

SIR,—In 1912 I received notice from a leading "Tariff" Insurance Office that the "tariff" rate for workmen had been increased from 15s. to £1 p.ct. I, believing that "tariff" rates were fixed minimum rates, agreed to the increase. On mentioning the rates to two gas friends, I find that their companies protested at the increase, and in both their cases it was withdrawn. I have now, after eight years, protested to my insurance office, who have reduced the rate to 15s. again.

Perhaps these facts may interest my brother secretaries; but having been "had" by the insurance company, I sign myself,

A.C.I.S.

June 24, 1920.

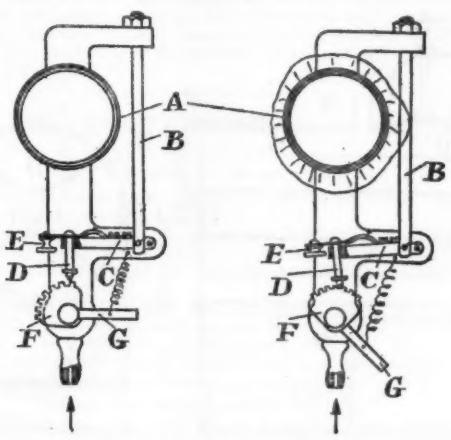
REGISTER OF PATENTS.

Safety Cut-Off Device for Gas-Burners.—No. 123,742.

SÄRNMARK, A. U., of Göteborg, Sweden.

No. 3926; Feb. 17, 1919.

This device has an arrangement sensitive to temperature—say, by the heat of combustion—which, in its turn, influences one or more means for cutting off the gas supply by a pawl-and-ratchet device.



A Swedish Safety Cut-Off for Gas-Burners.

In the construction shown as applied to a gas-stove, the thermostatic arrangement consists "of a pipe with slender walls made of a material which is a good conductor of heat, preferably of metal." In the vicinity of the burner A, the thermal device B is arranged, consisting of a thin-walled metal cylinder or pipe, at one end fixed to the burner frame. It is movably connected by a pivot or pin with a lever C, which can revolve on a pin fixed in the frame. Fastened to the lever is a spring supporting the stud or pin D and a press-button E. If the lever is turned slightly in one direction shown in the second arrangement depicted, the check-hook will engage the toothed disc F, which is firmly attached to the means for cutting-off the cock or valve G; thus moving as it moves.

When gas is lit—the valve being opened by hand—the device B becomes heated and expands, and, by means of the lever C, causes the hook D to engage the disc F, so that the valve G is kept in the position desired. Should for any reason combustion cease, the device B cools down and contracts, and the lever returns to its original position. If, while burning, the gas has to be turned off by hand or regulated, this is done by pressing the button E upwards, so that the check D is forced to release the disc F, and the gas can be turned off or regulated.

Synthesis of Ammonia at High Pressures.—No. 142,150.

L'AIR LIQUIDE SOCIÉTÉ ANONYME POUR L'ETUDE ET L'EXPLOTIATION DES PROCEDES GEORGES CLAUDE, of Paris.

No. 15,514; Sept. 24, 1918. Convention date, Feb. 20, 1918.

In a prior patent (No. 130,086) is described a process for the synthetic manufacture of ammonia, consisting in causing a mixture of nitrogen and hydrogen compressed to a very high pressure to pass over a catalytic material, at a temperature of from 500° to 700° C. The ammonia formed is separated by simple liquefaction at ordinary temperature, and the residual gases are sent into a second catalytic apparatus, and afterwards into a third and a fourth if necessary, with liquefaction, at the surrounding temperature, between each passage through the catalytic apparatus of the ammonia which is formed in each passage. After the last catalyzer, the gaseous residue, if it still contains sufficient hydrogen, may be employed for the production of motive power. The apparatus which forms the subject-matter of the present invention permits of the use of only a single catalytic apparatus, in place of several.

Measuring and Registering the Flow of Gases. No. 142,324.

THOMPSON, W. P.; a communication from POULENC FRÈRES, of Paris, and JEAN GOHIN, of Choisy-le-Roi, France.

No. 13,291; May 27, 1919.

This device for measuring and registering the flow of gases is operated by a difference in pressure along a pipe due to a constriction therein—the difference in pressure controlling the flow of a liquid, the total volume of which becomes a function of the total volume of gas passing along the pipe.

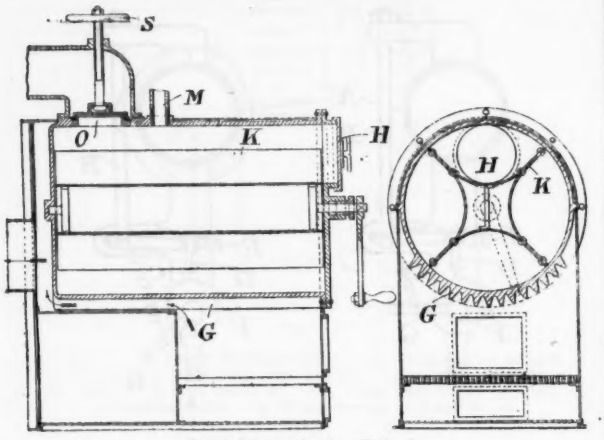
The constriction interposed in the fluid passage causes a change of level between two reservoirs of liquid communicating respectively with the passage before and after the constriction. The variation of level is compensated for at each moment by a retrograde circulation of the liquid provided by external agency, the integral volume of which, as measured by a direct reading of a totalizing meter, is a function of the total flow of the gaseous fluid.

Gas-Retorts.—No. 142,689.

GROUNDSTROEM, E. A., of Helsinki, Finland.

No. 14,475; June 6, 1919.

A retort according to this invention is illustrated in central sectional elevation and cross-section. It consists of a cast-iron drum cased in sheet iron. The casing fits closely to the drum at the top only. At the lower side, the front of the casing is extended downwards to make a square furnace—comprising a grate and (in the front) fire-doors above the grate and an ash-door under it. In the back wall there is a pipe for discharging the smoke to the chimney.



Groundstroem's Gas-Retort.

In order to increase the heating surface and the efficiency of the drum, there are, on the under side of it, longitudinal ribs G. Inside the drum (the front end of which is closed by a cover) there is a sheet-iron spider K, whose arms make four approximately sector spaces or divisions of the same length as the drum. These divisions are filled with the fuel from which the gas is to be obtained. The filling is effected through a circular opening in the front wall of the drum, the lowest part of which opening is level with the bottom of the upper division. When fire is made on the grate of the furnace, the fuel gradually becomes charred in the lowest division of the drum, and gas is produced which escapes through a pipe M. When the fuel in the lowest division is wholly charred the spider is turned by means of a handle through a quarter of a turn, so that a new division comes above the fire-place. After another quarter of a turn, a third division comes in the lowest position. The first division is then in the upper position and can be emptied through the opening H and filled with new fuel. In order to avoid the disadvantage of gas escaping through the opening H when the upper division is being emptied, there is in the upper end of the drum near the pipe M an opening O controlled by a valve operated by turning the wheel S. Each time a new division (through the turning of the spider) comes over the fire place, another division will be in the upper position, and can be emptied and filled again. Thus the apparatus works continuously.

Subjecting Gas or Vapours to the Action of Liquid in the Form of Spray.—No. 143,291.

FOWLER, C. H., of Great Crosby, Lancs.

No. 3638; Feb. 14, 1919.

This invention has reference to the type of apparatus described in patent No. 17,696 of 1910. It is particularly applicable for cleaning blast-furnace gases and the like having a fuel value and requiring to be freed—before use in (say) internal combustion engines—from dust and the like impurities, by the washing action of liquids propelled across the stream of gases by the centrifugal action of multiple discs continuously and uniformly wetted by the liquid, and rotated at a comparatively high speed. The object aimed at is more particularly in respect to reducing the quantity of liquid required to deal with a given volume of gas, while preventing any accumulation of impurities on the rotating parts which would throw these parts out of balance.

This is attained by providing two or more sets of multiple discs so arranged that the peripheries of the discs of one or more of the sets dip into a portion of the liquid, picking up the liquid and splashing some of it into the spaces between the set of discs on an adjacent shaft, so that the liquid is splashed on the separating collars on the latter shaft with sufficient force to cause it to be broken up by the impact and splashed on to the surfaces of the discs at a point as near the centre of rotation as possible—thus keeping both faces of the discs covered with a film of liquid constantly moving, under the action of centrifugal force, from the centres to the peripheries of the discs, whence it is tangentially propelled across the annular space through which the gases or vapour may be flowing.

Generating Gas from Coal, &c.—No. 143,361.

CORTHESY, J. H., of Barnsbury, N., and CASTELLI, S. T. S., of Kensington, W.

No. 9361; April 12, 1919.

This invention relates to the generation of gas from powdered coal, by the impingement on it of a gas-flame—the gas then passing through an incandescent mass of coal, coke, or refractory material.

A portion of the gas generated is conveyed to the generator burner through a pipe provided with a controlling valve. Valves are also arranged for the air supply for supporting the combustion of the generator flame (preferably an atmospheric or bunsen flame), for the air supply to the burner, for a supply of air for directing the powdered fuel into the generating chamber, and for controlling a supply of steam to be decomposed within the generating chamber. The controlling valves are connected to a common handle so as to be simultaneously operated. Means are also provided for controlling the supply of the powdered fuel to the generating chamber and for shaking or disturbing the container for the coal, coke, or refractory material in the generating chamber.

To enable the apparatus to produce two qualities of gas—say, producer gas and illuminating gas—branch passages are arranged from the outlet pipe for the producer gas which communicates with the fuel inlet pipe at points intermediate of the fuel supply and the generating flame; the passages serving to direct the heated producer gas into contact with the powdered fuel, with the result that "a gas rich in hydrocarbons is generated."

Synthetic Production of Ammonia.—No. 143,341.

RIDEAL, E. K., and TARRANT, A. G., of University College, Gower Place, W.C.

No. 5904; March 10, 1919.

This invention, relating to the synthetic production of ammonia, has for its object to provide means for recording the percentage of ammonia in the gases circulating through the system in order to detect any symptoms of poisoning in the catalyst as well as to facilitate the adjustment of the temperature to the point of optimum catalytic activity.

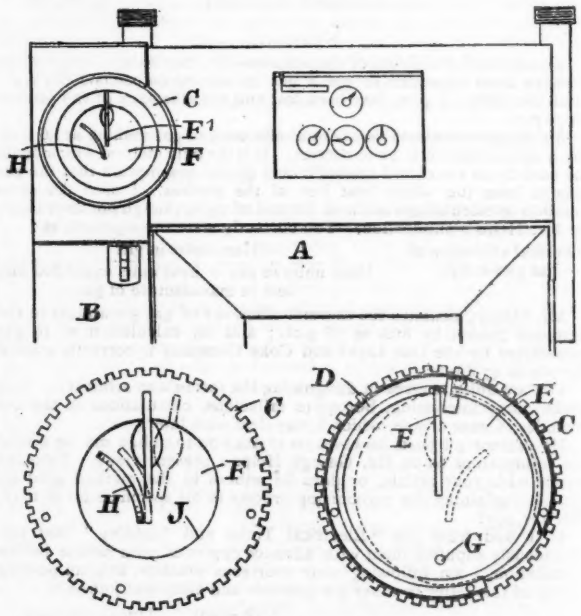
The invention is somewhat analogous to that forming the subject of patent No. 9205 of 1918, in that the inventors propose to detect and/or estimate the ammonia in the gases circulating in the system by passing them through an absorbent for ammonia (such as water) and then measuring the electrical conductivity of the solution after absorption—the value of the electrical conductivity being a measure of the amount of ammonia absorbed just as in the earlier specification the value of the electrical conductivity of the absorbent is a measure of the contained carbon dioxide, and therefore of the carbon monoxide in the gas mixture.

Prepayment Gas-Meters.—No. 143,679.

STAPLES, C. W., of Clapham Common, S.W., COX, W., of Lavender Hill, S.W., and GEORGE GLOVER & Co., LTD., of Chelsea.

No. 7934; March 29, 1919.

This invention relates to prepayment gas-meters with price-changing discs; and it provides an "improved form of coin mechanism, and an improved connection between the quantity wheel and the meter mechanism.



Staples and Cox (George Glover & Co.'s) Prepayment Gas-Meter.

A front view is given of a meter so fitted; also a front elevation, on a larger scale, of the price changing or set plate and connected parts detached from the meter, together with a rear view of the same parts. A is the meter casing on which the coin mechanism is mounted; and B is the money-box arranged below the coin mechanism. This comprises a disc-shaped set-plate C to the back of which is secured a ring D, forming a seating for a circular plate E, in which is cut a coin slot. Between the set-plate and the slot plate is another plate F pivoted eccentrically at G to the slot plate, and carrying a handle H, which projects through a central opening J in the set-plate. The plate F is shaped as shown, and can swing about the pivot G through a limited angle within the ring D. Moreover, a part of the ring is cut away to

provide an opening into which the projecting part of the plate F projects when the plate is swung to one limiting position of its movement—viz., to the right or left. In the latter position of the plate F, the slot plate E cannot turn in its bearing ring D. On the other hand, if the plate F is moved to its other limiting position the projecting part is thereby withdrawn from the opening in the ring, and the plate can then turn in its bearing ring. The plate is provided with a coin slot which comes in line with the slot in the plate E when the plate F is moved to the position in which its projection enters the opening in the ring D. When the plate F is swung about its pivot to withdraw the projection from the opening H, the slots do not register, and the coin slot is then masked by the plate F.

It follows from this construction that the plate E is locked when the coin slot is open to receive a coin, and the coin slot is covered or masked before the plate E can be rotated. The object of this construction is to prevent fraud.

The back of the plate E carries a coin-pocket, preferably of the kind described in patent No. 7928 of 1919. The plate also carries a stop finger which limits the backward rotation of the plate by coming against a fixed stop on the ring D. This ensures the alignment of the coin slots.

Incandescent Gas Lights.—No. 143,604.

WILLNER, S., of Tollington Park, N.

No. 4403; Feb. 21, 1919.

According to this invention, the incandescence body employed contains in its composition a mixture of blue ball clay, thorium nitrate, and powdered mica, with or without magnesia. The body is a domed shell of approximately hemispherical form provided with lugs so that it may be attached in an inverted position to the burner. Some perforations are provided in its wall.

The incandescence body contains in its composition 80 p.ct. of blue ball clay, 10 p.ct. of thorium nitrate, 3 p.ct. of mica, and, if desired, there may be added 7 p.ct. of magnesia. Each incandescence body is said to contain the material of which it is composed "in sufficient proportion to render it strong enough to be readily handled and to be self-supporting by its own circumference, as distinct from the ordinary mantles for inverted purposes which are supported by an intermediate ring to which they are secured."

Purification of Coal Gas.—No. 143,641.

BERK & CO., LTD., of Fenchurch Avenue, E.C., and HOOD, J. J., of Canonbury Park North, N.

No. 5079; Feb. 28, 1919.

According to this invention, coal gas is brought into contact with granulated alumina, preferably prepared from the tri-hydrate of alumina. In place of pure alumina, however, its nearest natural analogue—namely, high grade bauxite—may be used, or granulated and ignited magnesite. The granular material (contained in a cylindrical vessel) is kept at a temperature preferably between 200° and 600° C., and the gas (preferably preheated between the same limits) is passed through the vessel. As the gas travels through the granular material, the "objectionable sulphur bodies" are dissociated and sulphuretted hydrogen is generated. This may be subsequently eliminated "in the manner customarily employed in gas-works." When the efficiency of the granular material has become impaired owing to the deposition of carbon, the material may be regenerated by disconnecting the gas supply and passing air over the heated material.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for June 23.]

Nos. 16,010—16,645.

BADISCHE ANILIN & SODA-FABRIK.—"Process for transforming ammonia into a salt for use as a fertilizer. No. 16,086.

BADISCHE ANILIN & SODA FABRIK.—"Manufacture of nitrogen-hydrogen mixtures for synthetic production of ammonia." No. 16,209.

BADISCHE ANILIN & SODA-FABRIK. "Production of oxides of nitrogen from ammonia by catalytic oxidation.—No. 16,210.

BATEMAN, H. L.—"Heating vertical retorts for gasification of coal, &c."—No. 16,144.

BRITISH DYE-STUFFS CORPORATION,—"Manufacture of chlorinated derivatives of toluene." No. 16,179.

BUTTERIS, F. E.—"Liquid meters." No. 16,453.

FALL, T. A.—"Cocks or valves." No. 16,605.

FOSTER, H.—"Means for regulating air or steam supply to gas-producers and furnaces." No. 16,096.

GREEN, A. G.—See British Dye-Stuffs Corporation. No. 16,179.

HAY, W. G.—"Rotary fluid-compressors, exhausters, or engines." No. 16,127.

HERBERT, A. E.—See British Dye-Stuffs Corporation. No. 16,179.

HILL, J.—"Dry gas-meters." No. 16,239.

MARSHALL, F. D.—"Rotary grates for gas-producers." No. 16,208.

MINNITT, J. A. & J. E.—"Taps for controlling supply of fluids." No. 16,460.

NEILSEN, H.—See Marshall. No. 16,208.

PATERSON, J. H.—"Means for delivering gas from suction-gas producers." No. 16,571.

PODMORE, A. E.—"Gas-lamps." No. 16,339.

REYNOLDS, G. A.—"Rotary gas-engine." No. 16,443.

SMITH, D. J.—See Paterson. No. 16,571.

SOC. DES HAUTS-FOURNEAUX DE ROUEN.—"Calorimeters." No. 16,503.

THISSEN, J. I.—"Pipe or tube jointings." No. 16,080.

TIPPER, G. E.—See Hill. No. 16,239.

TULLOCH, T. G.—See Paterson. No. 16,571.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

The Ministry of Health Provisional Order (Gas) Bill was brought from the Commons, read the first time, and referred to the Examiners.

The Uxbridge and Wycombe District Gas Bill was read the third time, passed, and sent to the Commons.

The Rochester, Chatham, and Gillingham Gas Bill was read the third time, with the amendments, passed, and returned to the Commons.

The Great Northern Railway Company have presented a petition against the Gas and Water Provisional Orders (Mablethorpe and Sutton Gas Order) Bill.

HOUSE OF COMMONS.

Progress of Bills.

The South Metropolitan Gas Bill and the South Suburban Gas Bill were read a second time, and committed.

Petitions against the South Suburban Gas Bill have been deposited by the London County Council, the Chislehurst and Foots Cray Urban District Councils, and the Bromley and Dartford Rural District Councils.

The Brighton and Hove Gas Bill and the Southend-on-Sea Gas Bill, being unopposed, have been removed from Group F Committee, and referred to the Committee on Unopposed Bills.

The Uxbridge and Wycombe District Gas Bill was read the first time, and referred to the Examiners.

Imports of Incandescent Gas-Mantles.

Mr. DOYLE asked the President of the Board of Trade whether he was aware of the increasing extent to which incandescent gas-mantles were being imported into this country; whether in November, 1919, the total import, valued at £1880, was increased during the two succeeding months to £25,619; whether from Feb. 1 to May 8 in the current year the import reached a figure of £35,804; and whether, in view of the serious consequences of this import to the employers of British workpeople, he would take appropriate steps to safeguard the industry and prevent unemployment.

Sir R. HORNE replied that the statistics quoted were substantially accurate. The Government were carefully watching the position; and he hoped to be able to make a statement shortly as to this and cognate cases.

Colonel WEDGWOOD asked if Sir R. Horne was aware that one British company had practically a monopoly of gas-mantles, and that their shares have risen from 2s. 6d. before the war to 35s. at the present time.

No answer was given.

Coal Distribution Last Year.

Mr. BRIDGEMAN (the Parliamentary Secretary to the Board of Trade), in reply to a question by Captain Bowyer, said that in the year 1919 the coal available for home consumption, after deducting the amount used in operating the coal mines, was estimated to have been 162,000,000 tons. The principal uses of the coal were as follows:

Railways for locomotive purposes, tons	13,500,000
Gas-works	17,750,000
Electricity and water undertakings	7,500,000
Blast-furnaces	15,750,000
Domestic (including coal supplied to miners)	42,500,000
All other purposes	65,000,000

Threatened Strike of Gas Workers.

Colonel NEWMAN, on Monday of last week, asked the Minister of Labour whether the National Union of Gas Workers had decided in favour of an immediate general strike involving over 1000 municipal and private undertakings; whether he was aware of the determination of the general public that this essential public service should be carried on by voluntary effort if the Union refused to submit their case to arbitration, and what steps he proposed to take.

Dr. MACNAMARA (the Minister of Labour) replied that in connection with claims for an advance of wages and certain rearrangements in regard to overtime rates, week-end payments, and holidays, the Unions connected with the National Federation of General Workers had recently taken a ballot on the question of a stoppage of work to secure their claims. This ballot, the results of which were declared on June 3, showed a large majority in favour of a stoppage of work; and accordingly notices had been tendered, and would expire on Saturday (June 26). His Department had been in close touch with the representatives of the employers and of the Unions during the last few days; and at his suggestion a joint meeting was held on Tuesday last. He regretted to say that the meeting did not arrive at a settlement; and his Department had since remained in touch with the two sides. He was fully aware of the importance of the dispute, and would lose no opportunity of utilizing to the full the services and powers of his Department in an endeavour to effect a settlement.

Sheffield Gas-Works and the Strike Threat.—It was stated in the local Press last Thursday, on the authority of Mr. Ralph Halkett (the General Manager), that, should a national strike of gas workers take place, the Sheffield Gas Company had definitely decided to close-down their works.

Arbroath Gas-Works Accounts.—The report of the Arbroath Town Council on the gas undertaking for the past year shows that £1000 has been placed to retort reserve. After paying all charges for interest and sinking fund, the amount at the credit of revenue account is £2040. It is stated that coals will cost £5000 more for the current year, but that the revenue from residuals will be increased by £1600.

THE GAS REGULATION BILL IN COMMITTEE.

The Gas Regulation Bill was last week considered by Standing Committee A of the House of Commons, presided over by Sir W. PEARCE. There were a large number of amendments on the Order Paper. The Committee began their work on Tuesday morning, continued it on Wednesday afternoon, and completed it on Thursday.

HEAT-UNIT BASIS AND FINANCIAL REVISION.

Major HILLS moved to insert in clause 1 (which gives power to substitute a new basis of charges) for the words "standard or maximum price," the words "standard and/or maximum price." He thought his amendment was necessary to meet the case of the gas companies who prescribed the maximum as well as the standard price.

Mr. BRIDGEMAN thought the amendment unnecessary. Such an expression as "and/or" was an anomaly in Acts of Parliament.

Major HILLS said, so long as it was clear that the Board of Trade had power to deal with the point under sub-clause 1, he did not mind. He pointed out, however, that his amendment was not a restricting but an enabling one.

The amendment was withdrawn.

Major HILLS, on sub-section (3), which states that the price per therm fixed by the Order shall be a price "corresponding as nearly as may be to the price," &c., moved to omit these words, and to insert "based on." He did not understand the words of the clause; and if his amendment was accepted, the price would depend entirely on the calorific value of the gas. It would give an absolute standard of price for gas.

Mr. BRIDGEMAN said that the wording of the clause would do away with the necessity for going into three places of decimals when calculating prices. He thought the clause should stand, unless some better words could be chosen.

Major HILLS said he would be satisfied if the Parliamentary Secretary would consider whether a better phrase could be chosen.

Sir RYLAND ADKINS hoped the Government would adhere to their clause, as he considered the words "based upon" were ambiguous.

The amendment was withdrawn.

Sir HENRY COWAN moved to leave out "unavoidable increases" in sub-section (3), and to insert "the increases (if any) due to circumstances beyond the control of, or which could not reasonably have been avoided by, the undertakers which have occurred." He said the words in the clause did not cover the ground; as many things, including the labour market, had to be faced.

Mr. BRIDGEMAN accepted the amendment.

Sub-clause (3) states: "The price per therm fixed by the Order shall be a price corresponding as nearly as may be to the price fixed for each 1000 c.ft., but that with such addition (if any) as appears to the Board reasonably required in order to meet unavoidable increases since June 30, 1914," &c.

Sir RYLAND ADKINS moved to insert after "1914," "or such other date as the Board may, on the application of any undertakers, approve." He said his amendment was merely to extend the power of the Board to deal with cases of local authorities. The burden of proof would be on those who sought another date.

Major HILLS said the amendment was very far-reaching. It would enable companies to charge consumers for increases incurred back to any date—even ten or fifteen years. Such a heavy burden should not be placed on consumers. The whole reason for the Bill was to allow companies to recoup themselves for the extra cost of labour and materials during the war; and the Committee ought to limit it very definitely to the war period.

Mr. BRIDGEMAN said he could not accept the amendment; and it was withdrawn.

Mr. DAWES moved an amendment, "but nothing in this sub-section (3) shall authorize the Board to make an Order increasing the rate of dividend prescribed by the Special Act relating the undertaking, except so far as such increase may be necessary on account of such unavoidable increases in costs and charges."

Mr. BRIDGEMAN could not accept the amendment. The Board had no intention at all of making Orders as to dividends.

Mr. HAYDAY said he could not support the Bill if the Board were to have powers to place all extra charges on the consumer as well as giving the shareholders a dividend greater than they enjoyed immediately preceding the war. He knew many of the handicaps from which the companies were suffering; but he was sure the companies had no desire to utilize the Bill in order to secure something more in the way of dividend.

Major BARNES supported Mr. Hayday.

Mr. BRIDGEMAN said it was the intention that gas companies should be in a position to pay a dividend as before the war. There was no wish to interfere with the sliding-scale.

Sir HENRY COWAN said gas companies had been prevented from reimbursing themselves; and until they had been allowed to do this, it was not fair to suggest that they should not receive an adequate return on their capital.

Mr. M'VEAGH said the amendment ought not to be pressed.

On a division, the amendment was negatived by 12 votes to 9.

Mr. R. RICHARDSON moved, on behalf of Sir W. Joynson Hicks, an amendment to the sub-section that the Board may revise the powers of changing "if, owing to the net cost of the extraction of any bye-products of coal which under the Act the Board may require," it is shown to the satisfaction of the Board that the cost for production and supply of gas had substantially altered from causes not within the control of the undertakers.

Mr. BRIDGEMAN said he feared the two members did not realize the effect of the amendment. If the process was commercially sound, the company would carry it out; if it was not, somebody had to pay for it. And so the effect of the amendment would be that the general consumer would have to bear the burden of forcing the company to provide benzol from the gas for the benefit of the consumer.

Major BARNES said he would like to know what was the policy of the Board of Trade in arriving at the costs in this matter. No cost of producing bye-products should fall to the ordinary consumer.

Major HILLS said many companies produced a number of bye-products—benzol, sulphate of ammonia, scents, drugs, and a thousand and one things. It was almost inconceivable that a company should be compelled to make a certain bye-product like benzol and put the charge on the consumer, not of benzol, but of gas.

Mr. HAYDAY said too many extractions from gas caused the consumer to suffer.

The CHAIRMAN thought it was not necessary to press the amendment, which was withdrawn.

Major HILLS moved an amendment to the same sub-section, that an application to revise the charging power should be made by local authorities or others, "or by any consumer who may appear to the Board to have a substantial interest in the matter.

Sir RYLAND ADKINS said the amendment had many charms of novelty.

Mr. BRIDGEMAN hoped that the amendment would not be pressed. He deprecated the Board having to decide who was or was not a substantial consumer.

The amendment was withdrawn.

ADJUSTMENT OF CONSUMERS' APPLIANCES.

Sir HENRY COWAN moved an amendment to the sub-section prescribing that the undertakers, before making any change in the declared calorific value, should, at their own expense, take steps to alter consumers' appliances, by adding the words "except in the case of any consumer who objects to such alteration, adjustment, or replacement by the undertakers." He said the object was to protect the company against an obstructive consumer who might refuse to let them on to his premises, and thereby defeat the object of the company.

Mr. BRIDGEMAN accepted the amendment in principle, subject to proper wording.

CALORIFIC POWER DIFFERENTIATION IN ONE AREA.

Sir RYLAND ADKINS moved an amendment authorizing the undertakers to declare different calorific values to be applicable to different parts of their limits of supply. He said there might be cases where a company had two or three different works, and it might be desirable that there should be different calorific values. These the Board should be empowered to supply if they were satisfied that it was in the public interest to do so.

Major HILLS considered it a dangerous power to give to a company who might badly serve an outlying district.

Mr. HAYDAY agreed with Major Hills, and said that consumers might be injured, especially on Saturday evenings and on Sundays. The Board of Trade could be trusted to protect the interests of all parties.

On a division, the amendment was rejected by 12 votes to 10.

NO COMPULSORY BENZOL EXTRACTION.

Sir W. JOYNSON-HICKS moved an amendment:

> "An Order under this section may prescribe, in the case of any Order providing for the repeal of any enactment compelling the undertakers to supply gas of a prescribed illuminating value, that the undertakers shall erect and work to the satisfaction of the Board, suitable plant for the extraction of benzol and such other bye-products of coal as may be essential in the public interests."

He said the amendment gave the Board of Trade power to compel (as during the war) gas companies to scrub their gas in the interests of transport. He was not moving the amendment on behalf of any pleasure seekers, but on behalf of the trade and transport of the country, which needed greatly increased transport facilities. Coal was a national asset, and must be used in the best possible way for the good of the country as a whole; and one of the first needs was an effective motor spirit to carry on road transport. During the war Parliament made the companies scrub for benzol. Prior to the war, 20 million gallons of benzol were produced. During the war, this quantity rose to 40 million gallons, and now it had gone down again to 20 millions. Committee after committee reported in favour of more of this fuel being produced. It might be asked what right had they to put this obligation on the gas companies and the gas consumers. The utilization of coal in the form of gas was far and away the most economic method. The country was entitled to say to the companies that they must make the best use of their national asset in the interests of the country as a whole, especially as the companies were seeking powers to increase their charges.

Mr. BRIDGEMAN said that Sir W. Joynson-Hicks had stated that the companies were seeking for furthur favours. It seemed to him that they were only asking for justice; and in his view Sir William was wishing to place an obligation on the companies for the benefit of motor fuel users—a benefit for which other people would have to pay. The quantity of benzol that could be scrubbed for and extracted was not very considerable, and would not settle the grave problems before them. But the principle could not be sustained that the general consumer should subsidize the motor fuel consumer.

Sir RYLAND ADKINS said the users of gas were just as nearly "the whole of the country" as were the users of motor fuel; and why should one have preference over the other?

Mr. RICHARDSON supported Sir W. Joynson-Hicks. It was wrong, he said, to waste anything that the country had at its very doors.

The amendment was rejected.

PREPAYMENT CONSUMERS—NOTICES—CALORIFIC VALUE DEFINED.

Sir HENRY COWAN proposed to insert the following amendment in clause 1:

> "shall (where the charge to be made by any undertakers for the hire of a prepayment meter, and any fittings to be used therewith is by any Special Act or Provisional Order prescribed in terms of a sum per 1000 c.ft. of gas supplied through such meter)

prescribe the additional charge per therm which the undertake may make in respect of the hire of such prepayment meter and fittings."

This was withdrawn.

A number of verbal amendments were next inserted.

Under section 6 of clause 1, dealing with Orders requiring undertakers to give public notice of changes, it was proposed by Mr. Bridgeman, and agreed, to insert at the end of the clause: "That notice to be given under this section shall include notice to the council of any county borough, or urban or rural district within which any part of the undertaking or the limits of supply of the undertaking is situate."

Viscount ELVEDEN moved that notice should also be given to the Common Council of the City of London.

This was agreed to.

On the motion of Mr. BRIDGEMAN, it was agreed to omit, after the words in sub-clause (7), dealing with the meaning of calorific value of gas, the words, "burned under normal conditions in a calorimeter prescribed by the Gas Referees under this Act," and to insert "measured at 60° Fahr. under a pressure of 30 in. of mercury and saturated with water vapour."

Clause 1 was then passed.

INERTS QUESTION TO BE FURTHER INVESTIGATED.

On the resumption of the proceedings on Wednesday there was a lengthy argument on the proposal that sub-section 3 of clause 2 be omitted. This clause prescribes the composition and pressure of gas to be supplied; and sub-section 3 provides that "it shall not, if so prescribed by the Order, contain more than the permissible proportion of incombustible constituents."

Sir H. COWAN, in moving the deletion of the provision, said he could not understand why such a restriction was imposed when gas was not to be paid for by volume but by heat units. The gas consumer was completely protected, and had no interest in demanding a certain proportion of combustibles. But the nation had the greatest interest in the conservation of coals; and unless gas companies were allowed a free hand in regard to the proportion of incombustibles, the result would be that they could not produce gas of the most suitable quality under the most economical conditions.

Mr. HAYDAY said it was necessary to protect the consumer and not leave it open to the companies to supply gas of various calorific standards.

VISCOUNT ELVEDEN considered it would be dangerous if no limitation were put on the powers of the companies.

Mr. BRIDGEMAN said this was a very difficult and technical question, and was not made easier by the fact that technical experts on the subject did not see eye to eye. The question of incombustible constituents was simply one of the more combustible constituents they had. Though, on the face of it, it did seem that when the gas was charged for by calorific value this would be a protection, he did not quite see why those who spoke for the gas companies there showed such strong resistance to this clause. The intention of the clause was a provision of security that the consumer would receive a supply of gas of uniform density that would go through the nozzles of his burners. He could not agree to abandon this safeguard, unless the consumer could be protected in some other way. He would like to point out that it was not obligatory upon the Board of Trade to state exactly what should be the particular proportion. It might not be prescribed in the Order at all; and the Board of Trade therefore had discretion in the matter. No doubt this question had not been already gone into on the basis of scientific research to enable anyone to say with certainty what should and what should not be. He did not know if it would help the Committee to make this suggestion. He could not agree to the amendment as it was. But if the question was referred to the inquiry of experts who were going to deal with carbon monoxide, and be examined at the same time, he would be quite willing to accept an amendment that the sub-section be omitted, and the result of the inquiry be left for the Board of Trade to base an Order upon.

On this understanding, the sub-section was deleted, and the matter will be dealt with further on the report stage.

PRESSURE BETWEEN MAIN AND METER.

Sir WILLIAM RAEBURN proposed an amendment to clause 2 which provided that: "The minimum permissible pressure should be such pressure in any main or service pipe of 2 in. diameter and upwards as to balance a column of water not less than 2 in. in height, except as might be otherwise provided by the Order relating to any undertaking." The amendment was to leave out "service-pipe of 2 in. diameter" and insert "or any pipe belonging to the undertakers laid between the main and the meter having an internal diameter of 2 in." The amendment would clear-up any ambiguity as to what was a service-pipe. The words made it clear in his amendment that it was the pipe up to the meter—from the main to the meter. It was unreasonable to make the undertakers responsible for what might occur after the gas had passed through the meter. The duty of the undertaker was to put pressure into the meter; and it was well to define what the diameter of the pipe might be.

Mr. BRIDGEMAN said that it was perfectly reasonable not to make the undertaker liable for the pipe on the other side of the meter. But there were words in the amendment which he thought might create some difficulty. The words were "belonging to the undertaker." If these words were left out, he had no particular objection to the amendment; but he thought as it stood it might bring in undesirable limitation as to whose pipes they were.

Sir W. RAEBURN agreed to the leaving out of the words "belonging to the undertaker," and the amendment was accepted.

POSITION OF NON-STATUTORY COMPANIES.

Sir RYLAND ADKINS moved the omission of clause 3 to ascertain what were the intentions of the Government in regard to its terms. The clause read: "It shall not be lawful for any person to charge for the supply of gas according to the number of British thermal units supplied unless authorized to do so under this Act or by Special Act of Parliament." As he understood it, this would deal hardly with non-statutory companies, who would be precluded from utilizing up-to-date methods if they desired to do so. At present, these companies only existed on the goodwill of their customers, who, if they were not supplied with the kind of gas required, could withdraw their custom.

Mr. BRIDGEMAN said if there was anything in the points raised he would look into the matter between now and the report stage, when it could be raised again.

THE SUPERVISORY AND TESTING SCHEME.

In clause 4, which read:

"Where no gas examiner is appointed by the local authority or by the county council, or where the testing of gas is imperfectly attended to, two justices, on the application of not less than five consumers, may appoint a competent and impartial person to act as gas examiner, who shall have the same powers and perform the same duties as if he were appointed by the local authority, and the remuneration and expenses of the gas examiner up to an amount approved by the justices shall be paid by the local authority."

Major HILLS moved that the word "shall" should be inserted in place of "may."

Mr. BRIDGEMAN was of the opinion that the amendment was unnecessary; and it was ultimately rejected.

Sir RYLAND ADKINS moved an amendment to clause 5, which read: "The Gas Referees shall prescribe (*a*) the places at which and the apparatus and method by which tests whether continuous or intermittent shall be made to ascertain whether the undertakers are supplying gas in accordance with their obligations; and (*b*) the method by which any such apparatus shall be verified," &c. The amendment was to the effect that after the word "verified" there should be inserted, "and the method of determining differences between the gas examiner and the undertakers with respect to any alteration, adjustment, or replacement of any such apparatus." It was exceedingly important that there should be as little scope as possible for differences of opinion with regard to the way apparatus was altered, adjusted, or replaced.

Mr. BRIDGEMAN thought the matter came under clause 8. A division was taken; and the amendment was rejected by 10 votes to 8.

Mr. HAYDAY appealed to members whose names stood on the list of amendments to restrict them as much as possible to vital matters, so that progress might be accelerated.

On the resumption of the sitting on Thursday,

Sub-section C of clause 5, which laid it down that the Gas Referees shall prescribe the time and form of the reports to be made by the gas examiner to the Gas Referees, and the local authority or justices by whom he is appointed, was altered, on the motion of Sir Ryland Adkins, so as to omit the words "to the Gas Referees."

Sir RYLAND ADKINS said it was one of the amendments intended to give greater precision and certainty with regard to the procedure of examiners, and to make known, through an Act of Parliament, to the public generally how gas examiners were going to carry out their duties under the direction of the Referees. He understood that the Government took the view that these regulations need not be put in an Act of Parliament; but they were willing to make the necessary regulations when they were required. If they were in an Act, it would give proper parliamentary protection; but he would be quite prepared to withdraw the amendment if Mr. Bridgeman could say that the general regulations which his department would make in regard to these matters would be laid on the tables of both Houses.

Mr. BRIDGEMAN said he thought that a fair offer.

The amendment was withdrawn.

Mr. BRIDGEMAN submitted the following, which was added to the sub-section:

Provided that, unless otherwise agreed between the undertakers and the authority by whom the gas examiner is appointed, any testing place provided by the undertakers in pursuance of any Special or other Act of Parliament relating to the undertaking shall be deemed to be a prescribed testing-place under this section; but the Gas Referees may, if they think fit, prescribe any additional testing place in respect of that undertaking.

The obligation to provide a calorimeter in the case of undertakers who manufactured in the preceding year more than 100 million c.ft. of gas was made to apply instead to those who had "sold" this quantity.

Viscount ELVEDEN moved, for Major Hills, an amendment respecting the provision of a calorimeter, to insert "unless, having regard to the special circumstances relating to the undertakers concerned, the Board of Trade shall otherwise determine." He said the cost of the instrument was only £150; and it seemed to him that most of the suppliers of gas should be able to supply this necessary instrument, as the public should be protected as well as the railway companies who ran through the length and breadth of the land. Possibly the instrument might become cheaper.

Mr. BRIDGEMAN said the consumer was already protected. The only difference between the mover of the amendment and himself was that he wished to act on the advice of Referees, while the mover wished to put it on the Board of Trade.

The amendment was withdrawn.

Sir RYLAND ADKINS submitted an amendment providing that a representative of the undertakers might be present on any occasion on which the gas examiner inspects "or alters, adjusts, or replaces," the testing apparatus, but shall not interfere with the inspection or test.

Mr. BRIDGEMAN accepted the amendment as being quite reasonable.

Sir HENRY COWAN proposed an amendment compelling the gas examiner to give reasonable notice in writing of the day and the hour at which he would attend at the testing-place.

Mr. BRIDGEMAN said he would agree if the amendment were limited to the testing of "machinery"—it being suggested that the testing of the gas should not require notice.

Sir RYLAND ADKINS said it was only proper that the representatives of undertakers should be present.

Viscount ELVEDEN said that, if the machine were self-recording, anybody should be able to see it at any time. No one could alter the record.

Mr. BRIDGEMAN said he was doubtful about accepting the amendment without further consideration. After all, this particular machine was rather a novelty. He did not think there was any danger, because the Gas Referees could go at any time without notice. He would rather hold over his decision until the report stage.

The amendment was withdrawn.

Another accepted amendment, moved by Mr. BRIDGEMAN, laid it down that inspection might be made at any time "where it appeared necessary."

Another amendment by Mr. BRIDGEMAN gave leave to local authorities as well as undertakers, if they felt aggrieved, to appeal to the Chief Examiner.

A still further amendment, which was adopted, laid it down that the examiner should not be obliged to give a report unless he was appealed to.

ALL UNDERTAKINGS TO CONTRIBUTE TO THE GAS FUND.

An amendment was agreed to which eliminated from sub-section 3 of clause 7, "and who in any year ending on the 31st day of December have manufactured not less than 100 million cubic feet of gas." This makes all undertakings coming under the Act contributors to the Gas Fund for administrative purposes.

PENALTIES AND OTHER MATTERS.

Under the penalty clause, an amendment was inserted dealing with undertakers who refused to give reasonable facilities.

Sir HENRY COWAN, on the same clause, which imposed a fine of £50 for not affording information or facilities, and £50 for each day during which the failure continued, moved that the fine should be £10 in each case. A small company might be obliged to pay the same sum as a large company; and this might act very harshly.

Mr. BRIDGEMAN offered to compromise by making the fine £25.

This was accepted.

On the clause imposing a penalty if on any day "for a period of two hours and upwards" the calorific value of the gas is more than 5 p.ct. below the declared value,

Viscount ELVEDEN moved to omit the words quoted. He said that they would open the way to every possible evasion on the part of the undertakers.

Mr. DAWES thought the clause would meet the case of the works going wrong for a short period.

Sir RYLAND ADKINS hoped the Government would stand by their clause. If the words were struck out, where were they going to draw the line? It would be unfair to penalize for a momentary lapse in the calorific value.

Mr. BRIDGEMAN observed that much could be said on both sides. It would be unfair perpetually to harass the companies. Whether two hours was too much or too little, he did not feel very strongly on the point. He promised to look into the matter before the report stage.

The amendment was withdrawn.

On the same clause, it was decided that the undertakers should be liable to a forfeiture not exceeding £5 for every complete 1 p.ct. by which the calorific value was deficient "in excess of" the 5 p.ct. allowed under the clause.

Mr. BRIDGEMAN inserted an amendment that the undertakers should not be liable for more than one forfeiture in respect of any one day for any deficiency in calorific value, composition, or pressure as supplied from any one works. This was, he said, to meet cases where there were a large number of testing-places.

In clause 9, sub-section 4, dealing with the mode in which readjustment of charge is to be made to the consumers in respect of deficiencies in declared calorific power, provision (*b*) originally read: "In any other case be deducted from the divisible profits, and the dividend which the undertakers may pay on their ordinary capital shall be correspondingly reduced." The words "divisible profits" were deleted; and insertion made of the following, "amount applicable to payment of dividend on the ordinary capital of the undertakers for the year or half year in which such quarter occurs, and carried forward to the credit of the revenue account for the next following year or half year in addition to any other amount which would otherwise have been so carried forward."

Sir RYLAND ADKINS moved an amendment to the effect that proceedings might be commenced at any time within one month, instead of six months, as in clause 9. He said it was of the greatest consequence that actions should be settled promptly, as it was difficult after the lapse of time to get the necessary evidence.

Mr. BRIDGEMAN agreed that one month was too short, and six too long. He suggested three months.

This was accepted. A number of other clauses were adjusted to meet points suggested.

The Bill passed the Committee, and was reported to the House as amended.

Theft from the East Greenwich Gas-Works.

At the Greenwich Police-Court, on Monday of last week, before Mr. Fry, Robert Charles Fisher, a labourer, was charged with stealing nuts and bolts, value 10s., the property of his employers, the South Metropolitan Gas Company. Mr. Pasmore prosecuted. A constable deposed to stopping the prisoner as he left the Company's works at Tunnel Avenue, East Greenwich, at 6 a.m. on Sunday. As a handbag which he carried seemed very heavy, witness questioned the prisoner, who said he had "only a few bolts," which he had obtained at the Company's works, and which he admitted he had no right to take. The prisoner, who pleaded guilty, said a friend asked him on Saturday if he had "a few old bolts." Seeing a heap of bolts and nuts was temptation, and he took a few. Mr. Pasmore stated that the Company had suffered considerable losses at this station, at which some 2000 men were employed; and suspicion had fallen on innocent people. The prisoner had been employed at the works four years, and his wages averaged £3 18s. 2d. a week. The Magistrate fined Fisher £5.

MISCELLANEOUS NEWS.

SOUTH AFRICAN LIGHTING ASSOCIATION, LTD.

Increase of Expenses—Extension of Business—Reduced Prices.

The Ordinary General Meeting of the Association was held last Wednesday, at the London offices, No. 90, Cannon Street, E.C.—the Rt. Hon. Sir DANIEL F. GODDARD in the chair.

The SECRETARY (Mr. William Cash, F.C.A.) read the notice calling the meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN, in moving their adoption, first expressed regret at the absence of one of the members of the Board—Mr. A. L. Don. He was sorry to say that Mr. Don had been unwell lately; and he was not able to be with them that day. He believed this was the first time he had been away from a shareholders' meeting since the formation of the Company. Turning to the report, he (the Chairman) thought it might, on the whole, be called satisfactory, except probably from the shareholders' point of view, in respect of the recommendation that the dividend should be 1 p.ct. less than last year. This, however, was not a serious matter; and there were good reasons for it. Last year a sum of £1100 was provided in the accounts to write-down the investments of the reserve fund to market value. This was not sufficient. The market value had fallen further; and the Directors felt that it would be a sound and wise policy to write-down the investments again by £500. As would be seen, decision really laid between writing-down the investments, and paying an extra 1 p.ct. dividend to the shareholders. The Board thought in the interests of the undertaking it was better to get the reserve fund into proper financial position. The reduction in the dividend did not really amount to very much, on account of the rather intricate calculated claims of the income-tax people as between this country and South Africa. Last year on their holdings the shareholders received 10 p.ct., less 5s. 9d. tax, making £7 2s. 6d. This year, with the 9 p.ct. dividend, they would receive £7 1s. 9d. The difference was therefore only trifling; and they had the satisfaction of having the reserve fund in a sound condition. There had been a falling-off in profits. This was only to be expected, because of the increase in the cost of coal, materials, and labour. The labour market was affected in South Africa in a similar manner to what it was in this country; and this applied not only to the white labour, but to the coloured that the Company employed. As against this the business had increased, and was still increasing. The last report from Port Elizabeth—up to May 28 last—stated that the gas sales showed an increase of 3,911,000 c.ft., or 16·45 p.ct.; and at Grahamstown the increase was 9·26 p.ct. This might be taken as very satisfactory. The business was in many directions looking-up in Port Elizabeth. There were more manufacturers there now; and consequently the sales had increased. He believed the increase of consumption was also partly attributable to the decrease in price of 5d. per 1000 c.ft. at Port Elizabeth, and of 10d. at Grahamstown. He was not at all sure whether they were not a little premature in making the reduction. Perhaps the Board had not fully realized what the increased cost was going to be; and it might be that the Board would have to raise the price again to meet the expenses, which were now very heavy. The shareholders would understand that all the materials that were sent out from this country—such as retorts, pipes, stoves, and meters—had gone up in price; and they had to pay proportionately in South Africa. At Port Elizabeth, the increase in the gas sent out last year was 4 p.ct.; and there is an increase of 45 in the number of consumers. It would be remembered that when the electric light was introduced into Port Elizabeth they had a large fall in the consumption of gas—in fact, it went down at that time to 39 million c.ft. in the year. But they had gradually worked against this position, and increased the business until last year it was 51 million c.ft. At the beginning of this year they were a little handicapped by difficulty in obtaining slot-meters. He hoped this had been overcome now. It, however, affected the business to a certain degree; and they could not, during part of the year under consideration, comply with all the applications for gas on the prepayment system. The Company might have had a larger increase if they had been able to get the meters; but this and the impossibility of having repairs effected were common to the whole gas industry. The great difficulty of the year—and it was a real difficulty—was the increased cost of coal. They had a contract for, and relied upon getting, a local coal from Natal, which was known by the name of Burnside coal—a very excellent gas coal indeed. But there had been great railway difficulties. There was a great shortage of trucks there the same as here; and, as they could not get the coal, they had to use an inferior kind of coal sent from the Transvaal. This was a serious thing, as a very bad coal had a very detrimental effect. It meant less gas per ton; the coke was bad; and more coke had to be used to keep the retorts hot; more labour was required; and less tar was made. Therefore inferior coal accounted largely for the falling-off in the profits of the year. The make of gas was affected. It was only 9348 c.ft. per ton, as against 9858 c.ft. Then in regard to the make, they had also suffered owing to the difficulty of putting the retorts into proper repair. This was not the fault of the Engineer. Retorts were ordered two years or more ago; but they could not get them sent out and delivered. Freightage and one thing and another were difficult; and the retorts got into bad order. This made the work of the Engineer very difficult and anxious; and he could not get the same results. The cost of coal and rail had gone up for 1919 by 3s. 8d. per ton as compared with the previous year; while the cost of labour had risen something like 18½ p.ct. At Grahamstown there had been an increase in the quantity of gas sent out, and the number of consumers had also been enlarged. A point was that at both places the average quantity of gas which each consumer took had increased. The annual consumption at Port Elizabeth in 1919 averaged per consumer 14,504 c.ft., as against 14,171 c.ft. in 1918—a nice improvement. At Grahamstown, the average consumption per consumer was 17,378 c.ft., as against 16,557 c.ft. in 1918. This was very good. The cost of coal

per ton had gone up at Grahamstown by 4s. 1½d. As to the secondary products, all the coke and tar made had been sold. There was a great demand for tar; but unfortunately there was a good deal of tar being imported into South Africa, which might result in bringing-down their price. But he could scarcely believe it possible, when the high price of tar in this country was considered, that tar would continue to be imported to South Africa. However, there was at present very great competition in this way. They were doing fairly with ammonia; and there was a prospect of improvement in this respect. In the report there was a paragraph referring to the desire of the Corporation of Grahamstown for a supply of electricity. Their Manager (Mr. Donaldson) was going over to Grahamstown for the purpose of seeing what this really meant, and what the Corporation had in mind. Although the Company had a concession for lighting Grahamstown with electricity, whether it would answer their purpose to undertake it with the great expenditure of money that would be involved to do so, and the high rate of interest that had to be paid, he could not for the present say. Anyway, the shareholders might be sure the Directors would not embark on a scheme unless they saw it was a fair thing for the shareholders. The carry-forward was slightly reduced, but not very much. There was an item in the profit and loss account in regard to income-tax—£750. Regarding this, it would be seen that it was stated in the report that the dividend would be subject to a deduction for income-tax of 4s. 3d. in the pound—this being the effective rate after allowing for the amount recoverable by the Association in this country in respect of tax in South Africa. They had to pay the full 6s. in this country on the profits of the concern. But they were also charged a tax in South Africa; and they were allowed to deduct the amount of the tax paid in South Africa from the tax paid here. This explained why the tax was put down at 4s. 3d., when everybody else had to pay 6s. Regarding the accounts, the cost of manufacturing gas at Port Elizabeth had increased from £11,045 to £12,827; and the cost of distribution had risen from £4563 to £4601. The incidental items—such as taxes, rates, income-tax, show-room expenses, war fund donation, advertising account, superannuation, &c.—had risen from £1461 to £1843. The management expenses had gone up from £1030 to £1109. On the other side, the money value of the gas sold was very much the same. Rentals of meters and stoves, receipts from street lamps, and so forth, were a little more; and residuals £300 more. The result was that on the Port Elizabeth revenue account they had a balance of £6578, as against £8632. At Grahamstown the gas manufacturing costs went up by about £1000. In fact, the proportion of the items was much about the same as at Port Elizabeth; and the balance of profit was £2858, against £4773. On the profit and loss account the net profit for the year was £13,954, against £15,000 in 1918. The Board had received full reports from their local Engineer, who was doing excellent work for the Company in South Africa.

Mr. JAMES MACALISTER seconded the motion, which was unanimously carried.

On the motion of the CHAIRMAN, seconded by Mr. HENRY WOODALL, a dividend for the year was declared of 9 p.ct., subject to income-tax of 4s. 3d. in the pound, less the interim dividend.

Sir RYLAND ADKINS, M.P., asked if the South African income-tax was 1s. 9d. in the pound.

Mr. CASH replied in the affirmative, and added that there was also a dividend tax of 1s. in South Africa, as shown in the accounts.

Moved by the CHAIRMAN, and seconded by Mr. WOODALL, Mr. Macalister was re-elected to his seat at the Board.

Proposed by Mr. F. R. SMITH, and seconded by Mr. A. J. KINGDON, Mr. P. D. Griffiths, F.C.A., was reappointed Auditor, at a fee of forty guineas.

Sir RYLAND ADKINS moved a vote of thanks to the Chairman and Directors. They had heard with great interest the report that day. The peculiar difficulties that attached to gas enterprises in time of war (which were not confined to such enterprises in this country) had been surmounted to a large extent by the assiduity and care of the Directors, to whom the shareholders were very grateful. Might he make a suggestion? The fees payable to the Directors for the past twenty-four years had been at the rate of £500. When this sum was fixed in 1896, the sale of gas was 40 million cubic feet. It was now 71 millions. He should like to move after the vote of thanks had been passed that the sum set apart for Directors' fees should be raised, as from Jan. 1 last, from £500 to £750. They all knew the difficulties of the time and the lessened value of money. He hoped the proposal would be considered reasonable by the shareholders.

Mr. SMITH, in seconding the vote of thanks, mentioned that he noticed that during the past twenty-four years the capital of the Company had increased from £61,000 to £117,000. This gave a very fair estimate of the growth of the business. During the war, too, the Directors voluntarily gave up £100 a year of their fees.

The vote of thanks was unanimously carried.

Sir RYLAND ADKINS submitted, as a resolution, his suggestion as to the increase of the Directors' fees from £500 to £750.

This was at once agreed to.

The CHAIRMAN, on behalf of himself and colleagues, thanked the shareholders for this material recognition of the Directors' services. Proceeding, he moved a vote of thanks to the staff both at home and abroad. The Company were very dependent upon not only the honesty, but the business tact of their officers in South Africa; and they had every reason to be satisfied. Their Manager (Mr. Donaldson) was excellent in every department. He was careful, good with the men, and he looked after the interests of the Company most thoroughly. He (the Chairman) believed a good deal of the increase in the consumption of gas was due to the care he had shown. Mr. Sterley, too, their Accountant in South Africa, was also most thorough in the way he did his part of the business. Mr. Cash kept the Board up to the mark at home; and their friend the Consulting Engineer (Mr. Henry Woodall, of Messrs. Corbet Woodall & Son) kept them well advised as to every change they should make in their plant.

Mr. KINGDON seconded the motion, which was heartily agreed to.

Mr. CASH made acknowledgment on behalf of the staff in South Africa and London, and spoke of their appreciation of these recognitions of their services.

PLYMOUTH AND STONEHOUSE GAS COMPANY.

Annual Meeting.

Mr. J. H. ELLIS (the Chairman) presided at the annual meeting of the Company, which was held at the works last Tuesday.

The Directors reported a credit balance of £22,506, and recommended payment of a 3¾ p.ct. dividend on the ordinary stock for the half year ended March 31, with corresponding amounts on the other shares, which will absorb £5952, and leave £16,554 to be carried to the next account. Since July last, the Company have been obliged, by order of the Coal Controller, to obtain their supplies of coal by sea instead of by rail, involving a very serious additional expense; and this, together with the increase of 6s. per ton in the cost of coal, compelled the Directors to raise the price of gas 6d. per 1000 c.ft. as from Michaelmas last. Subsequent increases in the cost of labour, freights, and materials necessitated a further advance of 4d. at Lady-day. Unfortunately, a still further increase will be necessary to meet the recent addition to the price of coal. The rebate of 10s. per ton for domestic coal enabled the Company to make an allowance of 5½d. per 1000 c.ft. in respect of gas used during the Lady-day quarter for domestic purposes. Application is being made to the Board of Trade for an Order authorizing the Company to pay a dividend of three-quarters of the standard rates. The sale of gas for the year showed a gratifying increase of nearly 6 p.ct.

The CHAIRMAN, moving the adoption of the report and balance-sheet, said they had passed through a year of the very greatest anxiety. They had, nevertheless, made some progress. A new main had been laid to Mutley; and the result had been entirely satisfactory. Complaints of want of pressure in that district had now ceased. They had installed a new water gas plant, which enabled them to tide-over the great difficulties caused by the shortage of coal. The premises in George Street used by the Company as show-rooms, offices, and workshops had been purchased. Their lease expired in 1925; and as they had a goodwill in their business there, they could not afford to let the opportunity go of purchasing the premises on terms which their valuers said were fair. A telpher plant had been erected for the better conveyance of coke at the works—not only distributing it more expeditiously and at less cost, but also in a way which prevented the coke being degraded into breeze. They hoped for good results from this; for whereas breeze brought them only 20s. per ton, they had a market for coke at 60s. and upwards per ton. Stoves and prepayment meters had been bought in large numbers. He wished they had been able to purchase more, because prices were constantly rising. A tip for clinker refuse about 6 or 7 acres in extent had been acquired at Pomphlett; and though they had been using it only about three months, they had realized £100 more than the tolls which had to be paid by the lorries going to that place. People were beginning to find out the value of this residual. Concrete blocks made from clinker were of very great use; and he hoped they would be able to turn more of it to account for the benefit of the shareholders and to the advantage of the local building trade. A start had been made with the construction of the railway siding into the works; but they had not proceeded very far with it. In view of the renewals which would have to be carried out at the works, the sooner it was completed the better. Three acres of land near the works had been bought. They were getting cramped; and, moreover, they found that the land they bought some ten or twelve years ago for the erection of a holder was so far distant that the cost of laying a main to it at present prices was more than the price they had paid for the land.

CUSTOMS OFFICERS' ILLEGAL ACTION.

"I am glad to say," continued Mr. Ellis, "that we have got very good stocks of coal and oil—two months' supply of coal, and three months' supply of oil. In connection with oil, I cannot refrain from telling you of a difficulty which was quite beyond our control. We imported oil from America at 7d. per gallon when the Government controlled price was 8½d.; and people were saying you could not get oil in this country at less than 8½d. What happened? The Customs House officers were there, and took samples. They let us pump it into our tanks, and then they seized it—there was £24,000 worth—by putting a mark on our tanks. I came to the conclusion that it was an unlawful seizure, and told our people here to go on pumping in disregard of the seizure, but to write a polite letter to the Government Department, pointing out the difficulty we had in keeping the town supplied with gas, the difficulties there were in the Government establishments, and the almost impossible position they were creating, and begging them to let us use it. We were using it; but I wanted to get formal authorization. They wrote that, in view of the conditions, we might use it. Three weeks after they said again we might not. We still continued to pump; and three weeks after that the Court declared that their action was wholly illegal." In addition to those he had enumerated, numerous improvements had been made at the works; and special attention should be drawn to a very ingenious device which had been invented by Mr. H. C. Widlake, which would save no end of labour. It was a device by which they were able to tell at the works the pressure of gas at any part of their system at any time, without sending men to the spot. He was glad that so ingenious and labour-saving an invention was to the credit of one of their own staff.

THE ACCOUNTS.

With regard to the balance-sheet, it must be admitted that it was not nice reading; but no gas company's balance-sheet was nice reading in these days. On capital account they had spent £13,828, of which £8000 was for the purchase of the George Street premises; the balance being for stoves and meters. On revenue account the total debit was £277,007, an increase of no less than £40,563 over the previous year. This was due to coal and oil costing £18,000 more, wages in the carbonizing department alone £2500, works repairs £14,000 more, and mains £2405 more. On the credit side, they had a total of £283,027, an increase of £28,000, which came under the following heads: Sales of gas, £16,870; meter and stove rentals, £4607; coke, £7793. In regard to coke, they were controlled in two ways—in the high price

they had to pay for coal, and in the low price they could get for coke. If they had a free market for coke, and could sell to their French neighbours, they could get £5 per ton easily; and that would alter their figures considerably. As to the profit and loss account, they brought forward a balance of £18,434; and after paying £4755 for income tax, and transferring £9000 from the reserve account, there remained a balance of £22,500 to be carried forward, as compared with £25,000 last year. They had had to withdraw from the reserve fund; but it was worth noting that this account stood at only £3000 less than before the war, which was a matter for congratulation. The balance of the renewal fund account was decreased from £13,524 last year to £8174. The purpose of this account was to keep the works in a state of efficiency; and he would rather see thoroughly efficient workers, even if it meant that the balance of the renewal fund was entirely absorbed. The Company owed £42,000 to their bankers; the overdraft being due to the large stocks of coal and oil to which he had alluded. Their working capital had greatly advanced during the war, owing to the general change in values. In 1914 the value of their stock of coal, oil, residuals, fittings, &c., was £20,000; while to-day it was £62,000. Amounts due to the Company in 1914 were £34,000, and now £58,000. Charges for coal, wages, and other expenses, which in 1914 amounted to £101,000, were this year £242,000; and the causes were wholly beyond their control.

POSITION OF THE INDUSTRY.

The gas industry throughout the country was paying only about 3¼ p.ct. The Plymouth Company were able to pay 3⅞ p.ct. With the Government and municipalities offering 6 p.ct., it was obvious that capital would not flow into the gas industry unless something was done. There would have been a stoppage of the industry if the Government had not introduced a Bill for their relief. Under this Bill, the prospects were hopeful, for the opportunities opening-up before the industry of increasing its sphere of usefulness were never brighter. But, as Mr. Bridgeman, M.P., had said, the industry was up against an impossible position; and they wanted this recognized on the Statute-Book. The Bill was a just measure, bringing them back to the sliding-scale with its incentive to work for cheaper gas, and giving freedom as to the quality of the gas manufactured, while affording full protection to the consumers. They had received notice that their men intended to strike on Saturday. He hoped they would not. If the Company were profiteers, if they were making 10 or 12 p.ct. instead of 3⅞ p.ct., if their managerial expenses had gone up and they were feathering their own nests, he would say: "By all means let them have all they are entitled to and more." But when they found, in the words of the Government, that the industry was at the end of its tether, it would surely have been better if the notices had been postponed until, at any rate, they had the means of meeting such demands as might be agreed upon or awarded by arbitration. It would be unfortunate if the number of unemployed men in Plymouth were increased; and he trusted that, if the efforts which were now being made in London to adjust the differences should fail, the good sense of their own men would prevail, and that they would not plunge the town into the misery which would be caused by a stoppage of the gas supply. It seemed simple to postpone action until the Bill was passed, and they were in a position to negotiate; and he appealed to all concerned to take this course. In conclusion, he announced that the price of gas would be advanced 6d. per 1000 c.ft. next quarter, due to the further increase in the price of coal. This would bring the charge to 4s. 2d. per 1000 c.ft., which was still very low compared with many towns. He wished, on behalf of the Board, to acknowledge the unremitting zeal, industry, and ability of their Engineer (Mr. Percy Hoyte), the Secretary (Mr. G. H. Bolton), and the staff in general.

The motion for the adoption of the report was agreed to, as was also a resolution approving of the dividend recommended.

After the meeting, many of the shareholders inspected the apparatus Mr. Widlake has invented for reading gas pressures at a distance. It consists of two principal portions—(*a*) a gas-pressure register, with which is incorporated an electrical apparatus; and (*b*) an electrical meter calibrated to read in units of gas pressure. The former is placed in the district in which it is desired to learn the gas-pressure, and the latter at some convenient point on the works. By a very ingenious arrangement of needles, the least rise or fall of the bell of the pressure register is reflected in the electrical current, and is indicated on the meter at the works. In order that the shareholders might inspect and understand the working of the apparatus it was installed in the room; and, to show it under working conditions, it was connected through the telephone wires to the George Street showrooms, and back to the works—a distance of 3 miles—before registering on the meter. The demonstration was completely successful.

Shortage of Bricklayers at Birmingham.—So serious have become the arrears of repairs at the Birmingham Gas-Works, owing to the shortage of bricklayers, that on Tuesday last the Committee declared that unless an additional thirty or forty bricklayers could be obtained immediately, it might be necessary to restrict the output of gas next winter. It would appear, intimated the Committee, that all luxury building should be instantly discontinued, and that the bricklayers so released should take up jobs at the gas-works.

Subsidences at Birmingham.—The Birmingham Corporation Gas Committee report that considerable trouble has recently been experienced with the gas-mains in the neighbourhood of King's Hill, Wednesbury, owing to subsidences in connection with old colliery workings. At one time it was feared the gas supply to Darlaston would be interrupted; but fortunately the trunk main to the town, which passes through Wednesbury, withstood the strain thrown upon it. Valves had now been inserted in the trunk main on each side of the disturbed area: so that in case of need the length of main most likely to suffer damage if further subsidences took place could be isolated. This, however, would not prevent the interruption of the supply to Darlaston in the event of the trunk main being fractured by further subsidences. The Mining Engineer retained by the Corporation is investigating the cause of the trouble.

BRITISH CYANIDES COMPANY, LTD.

Annual General Meeting.

The Annual Ordinary General Meeting of the above-named Company was held on Wednesday last at the Cannon Street Hotel, Mr. C. F. ROWSELL (the Chairman of the Company) presiding.

The SECRETARY (Mr. G. N. Monkhouse) read the notice convening the meeting and the Auditors' report.

The CHAIRMAN, in moving the adoption of the report and accounts, said that the gross profit for the year on trading amounted to £69,919, as against £62,720 for the previous year; while manufacturing and general expenses were £42,265, as compared with £40,992. The balance of profit for the year, subject to excess profits duty (if any) was £25,042, as against £20,572. It was very satisfactory that they had succeeded not only in maintaining their profit during the past year, but in increasing it substantially, when it was borne in mind that during the whole of the period they had been extending their works and had had to carry out many vital alterations in existing plant. The result secured was undoubtedly due to the energy with which the business had been run, and to the loyal assistance which the Managing Director had received from their general staff and also from the whole body of workmen. In the balance-sheet there had been a considerable change during the year. The old works, described as leasehold works and buildings, together with goodwill, &c., stood in the books last year at £92,605. This figure had been increased to £101,066; £14,282 having been spent on buildings, plant, and new developments in this part of their works. Their new freehold works had been increased from £63,441 to £166,053; the outlay during the year amounting to £104,121. The extensions and alterations were of a very substantial character, and well might have interfered with the profit-earning of the business while they were in progress. Referring to investments in allied companies, he said that the Oldbury Syndicate now stood at £34,758; the loan to that Company having been increased by a little over £8000 during the year, representing the costs of the experiments which had been carried out during that period on the barium process. With regard to the British Potash Company, they were now in the middle of important negotiations which would no doubt result in a considerable change in the position of the Company before the shareholders met again next year. The business of Fred Danks had been liquidated with a fair profit to the Company. Even had they shown a loss in this connection, the acquisition of Fred Danks, Ltd., would have been more than justified by the amount of land they secured by the purchase and the great extensions to their works which it would enable them to carry out. In addition, they had at their disposal, as the result of the liquidation, a magnificent building which it would have been extremely costly to erect at the present time. The items representing the working capital assets of the business other than the amount for calls which they had still to make on their partly-paid shares totalled £159,535, as compared with £90,452 last year, and there was still £48,542 to be called-up on the new issue of shares. They were transferring to reserve account, out of the surplus arising from the premium on the issue of shares and the surplus which had arisen from the realization of investments, £77,000; bringing it up to £100,000. The Directors recommended a dividend on the ordinary shares for the last half year of 10 p.ct. per annum, carrying forward, subject to the excess profits duty (if any), £3982. Referring to what the Company had done in the way of attempting to solve the very difficult problem of labour, he stated that the work of the Consultative Committee during the past year had been of great assistance to the Board, and had helped to maintain the excellent relations between the Directors, staff, and employees. In conclusion, he said that, notwithstanding the difficult period through which they were passing, and the possibly still more difficult period they were reaching, he was still optimistic as to the future of the Company.

Sir ARTHUR DUCKHAM, K.C.B., seconded the motion.

Mr. KENNETH M. CHANCE (the Managing Director), dealt at some length with the manufacturing side of the business, and, referring to the completion of the extensions, said that the Company were doubly fortunate in having done the work at a cost far below anything possible to-day, and in having ample building accommodation available for further extensions. They had already materially decreased their costs of production, and had opportunities of further economy which they could, and would, develop to the full. Their cash position was very strong; and the demand for their products was such that for the sale of those which were unrestricted by "D.O.R.A." they were quite unable as yet to fill all their orders promptly. He feared competition from no quarter whatever so soon as the unfair restrictions were removed.

The motion was carried unanimously.

MALTA AND MEDITERRANEAN GAS COMPANY, LTD.

A Considerably Improved Position.

The Ordinary General Meeting of the Company was held on Tuesday last, at the London Offices, Nos. 59-60, Gracechurch Street, E.C.—Colonel STEPHENSON R. CLARKE, C.B. (the Chairman), presiding.

The SECRETARY (Mr. C. J. Daun) read the notice convening the meeting, and the certificate of the Auditors; and the Directors' report and statement of accounts were taken as read.

The CHAIRMAN said it would be seen by the report that the results for the year ended March 31 last showed a considerable improvement on the previous year. Turning to the revenue account, the sale of gas realized over £2000 more, and of coke about the same increase. Charcoal, &c., fetched £1000 less; and fittings and meters gave an increase of £600. A big item was the increase in the exchange from a profit of £807 to one of £7758. This was a large item, and was accounted for by the fact that they had had to remit large sums of money to Sicily, and the Italian exchange had been as high as 100 lira to the pound sterling. The par of exchange was, of course, about 25·20. This, of

course, had diminished the loss that would otherwise have been experienced from working the two unprofitable stations there. The petroleum lighting they had had to undertake at their Sicilian stations showed a profit of £1256. On the other hand, the coal, wood, oil, and coke used had cost between £10,000 and £11,000 less than last year; the amounts carbonized being: Coal, wood, and lignite—1920, 8169 tons; 1919, 8044 tons. Oil—1920, 56,199 gallons; 1919, 59,836 gallons. There was an increase of £1100 on maintenance and £700 in general trade charges. The war bonus to employees at Malta showed an increase of £800 over the previous year. As the shareholders were aware, wages and salaries had advanced all the world over. The Company were left with a balance to profit and loss of £12,220, against the loss twelve months ago of £7419. Turning now to the general balance-sheet, the fixed assets stood at £113,884, compared with £126,422 a year ago. This reduction was due to the fact that the Company had abandoned the Marsala works. The cost of doing this had reduced the amortisement account from £45,174 to £30,902. The increase in stocks from £9540, in 1919, to £32,814, in 1920, was due entirely to an augmentation in the stocks of coal. These remarks, he thought, covered the most salient features of the figures which the Board had presented, with the exception that the sundry creditors had increased from £9343 to £15,452. This included an amount owing by the Company to the Italian Government for coals and wood supplied—about £8182—which was a little less than the claim the Company had against them for loss sustained in carrying on the works at Trapani and Marsala during the war. Since the last meeting, the Italian Government had stated that, when it was impossible for a gas company to carry on their works on a proper economic basis, and the Company could prove that such was the case, they should be permitted to abandon their concession. As the Company found it was impossible to carry on the Trapani works, except at a great loss, unless they could obtain a remunerative price, they were applying that they might be allowed to give up their works and concession for supplying gas in this town. The Board estimated that they had enough to the credit of the amortisement account to meet the capital expenditure standing in the books and extra incidental expenses. As he had said, he considered the accounts showed a great improvement on those presented to the shareholders a year ago; and he really hoped the Company had now rounded the corner. There were, however, still great difficulties to face. The export of coal had been very much reduced, and the price for export was exceedingly high. Malta had to bear the brunt of these high export prices, the same as a foreign country. This appeared to the Directors to be extremely hard in the case of a British Colony, and they had made representations on the subject to the proper authorities on various occasions, but without success in obtaining any relief. At the same time the Company were better off than most foreign gas companies, in that they had had assistance given them on two or three occasions to enable them to receive the quantity of coal required to supply the gas-works at Malta. For this they were grateful. He concluded by moving the adoption of the report and accounts.

Mr. A. M. PADDON formally seconded the motion.

Mr. JOSEPH CASH asked how it was that the receipts for coke on the present occasion were only £22,344. This was certainly an increase upon 1919, but was very much less than in the years 1917 and 1918, notwithstanding the very large increase that had taken place in the value of coke.

The CHAIRMAN replied that a much larger quantity of coke was now being used in making water gas.

The resolution was then put to the meeting, and carried unanimously.

On the proposition of the CHAIRMAN, seconded by Mr. STRACHAN C. CLARKE, a dividend of 4 p.ct. (less income-tax) on the first preference shares was declared for the year ended March 31.

Mr. PADDON, in proposing the re-election as a Director of Colonel Stephenson Clarke, remarked that the change in the affairs of the Company now as contrasted with what existed at the time of the last meeting with the proprietors was very marked; and the Chairman had indicated the dimensions of it. From a loss to the payment of a dividend, even on the limited basis proposed, was a tremendous advance; and they must also realize that they had been relieved of a large proportion of their disabilities in their obligation to supply gas in Sicily, and had a prospect, with hard work and perseverance, of being soon relieved of the remaining disability. Many years ago, he believed the same problem presented itself; and the solution arrived at unfortunately was to continue the supply of gas in Sicily. For all these results the shareholders were indebted in a very great degree to the Chairman. The life of the Company subsisted really in its supply of coal; and in securing this, the Chairman had been unremitting in efforts and in the exercise of the exceptional influence he had been able to bring to bear upon this matter. Far more in their own interests than in those of Colonel Clarke, the shareholders should re-elect him to the position he had so well occupied during these arduous times.

Mr. A. F. PHILLIPS seconded the motion, which was unanimously carried.

The CHAIRMAN, in acknowledgment, said he had been connected with the Company for 29 years. For the first 20 years or so, their task was a very easy one. A regular dividend, though not a very big one, was paid; and the position of the Company was gradually strengthened. During the war, however, matters had gone from bad to worse. They had to rely in Sicily on local managers. The works were small; and they could not afford to put a first-class English engineer in charge of each station. They did, however, have such a man at Malta (no great distance away), who could always, before the war, if any difficulty arose, slip across in a very few hours, and put matters right. When the war was on, he could no more get from Malta to Sicily than he could have gone from Malta to America; and things had to take their own course.

Proposed by Mr. F. R. SMITH, seconded by Mr. CASH, the Auditors (Messrs. E. L. Burton and William Cash) were re-appointed.

Mr. CASH, in moving a hearty vote of thanks to the Chairman and Directors, said the transformation that had taken place in the accounts was the best tribute which could be paid to their work. The outlook was very much more cheerful than a year ago; and for this their thanks were due to the Board.

Mr. SMITH seconded the vote, which was cordially passed, and acknowledged by the CHAIRMAN.

GAS COMPANIES AND CO-PARTNERSHIP.

The thirty-fourth report of the Labour Co-Partnership Association, for the year 1919, contains the following reference to gas companies:

The co-partnership gas companies have been sorely tried by the economic changes due to the war, notably by the greatly increased cost of raw material and labour. The working of sliding-scale provisions, which were made in pre-war days to suit pre-war conditions, has given no opportunity for making a profit (above the "reserved limit") out of which a bonus on wages would be payable. Some gas companies have modified their schemes so that a bonus might still be paid. The Croydon Company fixed a minimum bonus of 4 p.ct. irrespective of any failure of dividend; and the Gas Light and Coke Company now pay a bonus on wages at the same rate as the dividend on the ordinary stock. At Liverpool and at Redhill, *ex gratia*, payments of "temporary bonus" have been made.

Legislation for the financial relief of gas companies is now pending; and it will be necessary for each company to modify or reconstruct its scheme to suit the new conditions. It is interesting to note that the South Metropolitan Gas Company are asking for power to dispose of profits, above the amount needed to pay the standard dividend, in the following manner:

To consumers, by reduction of price, ¾ or 75 p.ct.
To employees, by bonus of wages, ⅛, or 12½ p.ct.
To shareholders, by increase of dividend, ⅛, or 12½ p.ct.

The proposed arrangement has the great merit of simplicity, while it adheres strictly to the basic principles laid down by the late Sir George Livesey and the pioneers of the co-partnership movement.

Some gas companies—*e.g.*, Cardiff, Maidenhead, and Wrexham—appear to have abandoned co-partnership; but we hope they will reconsider the question when new legislation gives them the opportunity to do so.

Particulars at Dec. 31, 1919, of British Gas Companies who have adopted Co-Partnership and Profit-Sharing.

NAME OF COMPANY.	No. of Years Scheme has been in operation.	Capital in 1919. Total Share and Loan.	No. of Employees under Agreement for Profit-Sharing or Co-Partnership.	Amount divided among Employees for Year ended December, 1919.	Amount per Cent. on Wages.	Total Profit to Employees since Scheme was adopted.	Amount of Shares and Deposits held by Employees in the Company. Market Value on Dec. 31, 1919.
South Metropolitan (*a*)	30	9,255,350	7,667	*Nil*	*Nil*	771,804	342,385
South Suburban . (*a*)	26	1,507,984	1,099	1,395*	¾	67,766	54,515
Commercial . . .	18½	2,543,280	1,093	3,220*	3	91,987	69,357
Tunbridge Wells . .	11½	185,266	137	*Nil**	*Nil*	5,635	3,692
Bournemouth . . .	11	895,000	312	1,666	4	25,026	22,899
Walker and Wallsend	11	262,728	95	352	3½	4,170	3,483
Wellingborough .	11	90,853	79	407*	4	3,719	3,724
Tottenham . . . (*c*)	11½	1,948,705	545	*Nil**	*Nil*	39,347	36,215
Croydon. . . . (*b*)	11	783,273	598	2,270	5	21,514	7,810
Weston-super-Mare .	9	176,213	112	*Nil*	*Nil*	2,276	713
Gas Light and Coke .	11	29,455,018	8,680	37,598	3	331,196	199,638
Grantham	10	106,068	60	353	5	2,560	1,766
Watford	10½	220,735	171	581	3	8,265	5,940
Wandsworth . . .	10	1,302,295	798	*Nil*	*Nil*	27,676	21,901
Liverpool	8½	3,049,124	1,699	3,832	2½	61,893	44,292
Harrow	9	333,956	88	309	3	3,032	2,000
Hertford	8	22,609	26	74	3	568	505
Redhill	6½	134,386	66	129*	2	916	332
Ipswich	6	191,940	175	237	1	2,415	1,530
Totals . . .	—	52,544,783	23,500	52,443	—	1,471,765	822,717

(*a*) Three employee representatives on the Board.
(*b*) For year ended March, 1919.
(*c*) A special contribution to superannuation fund is paid which is equal to 2½ p.ct.
* Year ended June, 1919.

Notes:

Dartford has amalgamated with the South Suburban.
Suspended: Cambridge, Merthyr Tydfil, Swansea, Ilford.
Ceased: Wrexham, Maidenhead, Plymouth, Cardiff.
No information: Waterford, Chester, Leamington, Rugby, Gloucester, Walker and Wallsend, Croydon, Longwood, Aldershot, Canterbury, Shrewsbury.

Gas Explosion at Eastbourne.—While testing with a match some gas-piping in premises situated in Junction Road, Eastbourne, the workmen caused an explosion which did a certain amount of damage to the place. The men themselves, though one was flung violently against the wall, were lucky enough to escape without serious injury.

Tiverton Gas-Works Report.—The report on the Tiverton municipal gas undertaking for the year to March 31 shows total receipts of £17,983, and an expenditure of £15,317, leaving a gross profit of £2666, and a net profit to the reserve fund of £1394. In moving the adoption of the report to the Town Council, the Mayor said he had received prices from 24 gas undertakings, and Tiverton stood sixth as regards cheapness. He thought the borough was fortunate in having gas-works well looked-after as to machinery, and carefully managed as to working and output. The staff were complimented on their success.

SALFORD GAS COMMITTEE'S REPORT.

The report of the County Borough of Salford Gas Committee (signed by the Chairman, Alderman F. S. Phillips, J.P.), for the year ended March 31, opens by recording that the sales of gas have shown an increase equal to 9·52 p.ct.

The coal and cannel carbonized during the past year amounted to 130,999 tons, as compared with 132,581 tons for the previous year. The quantity of gas made was 1,699,340,000 c.ft., as compared with 1,554,813,000 c.ft. The installation of vertical retorts was completed early this year; and the first retort was charged on Jan. 29. The plant has since worked continuously, and is giving every satisfaction. The total number of cookers, ordinary and prepayment, on hire at March 31 was 19,315, and the number of gas-fires 3586. These figures show a very satisfactory increase as compared with last year.

The receipts from the sales of coke, tar, and sulphate of ammonia exhibit a considerable increase as compared with last year. The expenditure during the year has again been very heavy, owing to the further advance in wages and increased war bonuses, additional large advances in the cost of coal, and increased prices for all materials required. On Oct. 1 the price of gas was increased 6d. per 1000 c.ft. to the ordinary consumers; and the amount supplied by prepayment meters was reduced from 20 to 17·45 c.ft. per penny. This increase in the price of gas was estimated to barely cover the increased expenditure during the year; but owing to improved working results, increased receipts from residual products, and the large increase in the sales of gas, the Committee have pleasure in recording that, after paying all statutory requirements, they have been able to reduce the amount owing to the district fund from £44,834 to £19,552—a reduction of £25,282.

On Jan. 19, railway rates for coal, coke, and patent fuel were advanced by 25 p.ct. and 3d. per ton flat-rate additional, with a minimum addition of 6d. per ton, and a maximum addition of 2s. per ton. The increase, which will operate for the whole of the present financial year, will cost the undertaking about £5000. Since the close of the financial year there has been a further increase of 4s. 2d. per ton in the price of coal, placing an extra burden on the undertaking of nearly £30,000 per annum. Wages and war bonuses are still rising; and the cost under these headings for the ensuing year will show a considerable increase on the past year. The prices of materials are also continually advancing. Against this great increase in expenditure, it is probable there will be some improvement in the total receipts from residual products; and it is expected there will be a further increase in the sales of gas.

In view of the circumstances referred to, the Committee may have to consider the best means of increasing the revenue of the undertaking.

The working statistics prepared by the Engineer and Manager (Mr. W. W. Woodward) indicate that the make of gas per ton of coal carbonized amounted to 12,972 c.ft., which compares with 11,727 c.ft. in the previous year—the figures of unaccounted-for gas for the two years being respectively 4·41 p.ct. and 4·61 p.ct.

There is a gross profit on the working of £123,651, and a total contribution in aid of the rates of £12,090. Last year there was a gross profit of £71,091.

OLDHAM GAS UNDERTAKING REPORT.

In his report to the Gas Committee, covering the twelve months ended March 25 last, Mr. Ernest Parry, the Commercial Superintendent of the Oldham Corporation Gas Department, says the gross revenue amounted to £341,297, and the expenditure to £300,173; the balance carried to profit and loss account being £41,124, and the net profit on the year's working £10,303. The debit balance of £7341 brought from the previous year, and the sum of £7500 contributed to the borough fund, leave a debit balance to be carried forward of £4537. The average cost of coal carbonized was 30s. 3·9d. per ton, which represents an increase of 5s. 1·41d. over the previous year.

Coal supplies during the past winter caused grave anxiety; but the Committee were ultimately able to get through without materially reducing pressure. Though coal has now been decontrolled, it does not appear likely that the situation will be appreciably different for some months to come. The quality of the coal supplied leaves much to be desired, and still compares unfavourably with the pre-war quality. This question has received the attention of the National Gas Council on many occasions; and everything is still being done which is likely to bring about some improvement. The net price realized per 1000 c.ft. of gas sold during the year was 3s. 9d., as compared with 3s. 2·11d. in the previous year.

The quantity of gas consumed by public lamps was 28,425,000 c.ft. As compared with the last year of normal lighting, this shows a reduction of 74,529,000 c.ft. The quantity of gas manufactured at the different stations was: Oldham, 186,221,000 c.ft.; Higginshaw, 632,823,000 c.ft.; Hollinwood, 590,642,000 c.ft.; ditto (water-gas plant), 197,552,000 c.ft.—a total of 1,607,238,000 c.ft., compared with 1,504,655,000 c.ft. in the preceding year, and showing an increase of 102,573,000 c.ft. The amount of coal used was 93,501 tons. The average quantity of gas made per ton of coal carbonized was 15,077 c.ft., as compared with 14,955 c.ft. the previous year. The gas unaccounted-for was 10·77 p.ct. of the quantity made.

The question of the lighting of the area was specially discussed at a recent meeting of the Chirk Rural District Council. The Chairman said the population of Chirk was so small that a system of electricity would never pay; but another member stated that he would not like to go on with the gas-works until they knew what an electric scheme would cost. They decided to seek advice on the matter.

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instead of WATER-TUBE GAUGES and

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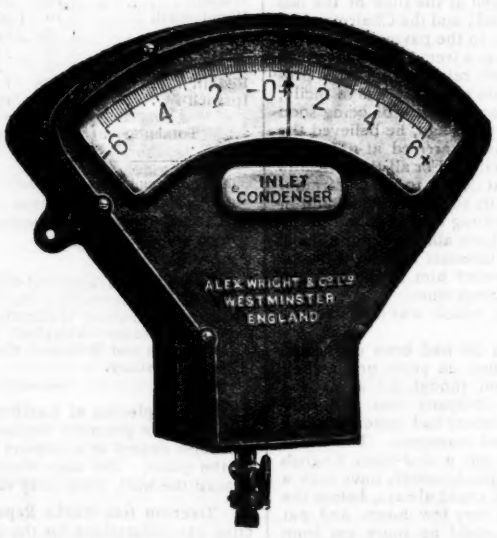
No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.



Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

Incorrodible, Accurate, for foul or purified gas.

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GAS-WORKERS' STRIKE NOTICES SUSPENDED.

Alderman H. Simpson, of Birmingham, presided at York last Thursday over a full attendance of representatives of all the trade unions concerned in the gas-workers' dispute. Captain J. O'Grady, M.P. (Secretary of the National Federation of General Workers), and Mr. A. Hayday, M.P. (Secretary of the National Industrial Council for the Gas Industry), acted as Joint Conference Secretaries. The following resolution was adopted':

> In view of the employers' offer of 1s. per day or shift, to-date from June 1, 1920, this conference agrees to the suspension for one week of the notices to cease work; and that a Negotiating Committee be appointed to continue the discussion with the employers' representatives on all the points of our claim.

A joint meeting has been arranged for this week.

The decision to suspend the notices for a week was discussed by a mass meeting of Sheffield gas-workers on Friday. At first the meeting was in favour of an immediate stoppage, regardless of the official instructions. But after the position had been outlined, the following resolution was carried with a few dissentients : "That this meeting emphatically protests against the delay in settling our claim, and will not agree to any further suspension of notices beyond July 3. It further expresses itself emphatically of the opinion that the present offer of the employers is hopelessly inadequate, and will not bind itself to accept any settlement that has not been submitted to the members for their approval."

GERMAN COAL TAR AND BENZOL.

Following on legislation passed by the late National Assembly, a Government Order has, says the "Iron and Coal Trades Review," been issued in Germany creating a so-called self-governing organization for the coal-tar industry, under the title of the Economic Union for Crude Tar and Tar Products. The Union is to regulate the production and sales of crude tar, tar oil, fuel oil, and briquette pitch, derived from coal ; and the export and import trade in these products has also been placed under its control. The Union is to be composed of 45 representatives of producers, workers-up, consumers, merchants, State authorities, and workmen, together with 45 deputy members. Under the Order, the Union is forbidden to restrict imports for the purpose of maintaining high inland prices; and the home quotations fixed by the Union's Price Committee for crude tar, tar oil, and pitch are to be considered as the maximum. All existing contracts for delivery are cancelled with the coming into operation of the new organization, whose working expenses are to be defrayed by a levy on producers.

The production of tar, which in former peace times amounted to 1,400,000 tons per annum, has considerably declined, owing to the transfer of territory and the compulsory reduction in the consumption of gas. It is estimated that the output this year will be about 650,000 tons. Under the Treaty of Peace, Germany has to deliver annually 50,000 tons of tar and 35,000 tons of benzol to the allies for a period of three years; and it is calculated that the balance of the production will be insufficient to meet the requirements of inland consumers.

The report of the Benzol Syndicate of Bochum states that a considerable decline in the production took place in 1919. The deliveries of 90 p.c. benzol amounted to 78,077 tons, compared with 116,520 tons in 1918; of toluol, to 13,739 tons, as against 31,700 tons; and of benzol solution, to 13,366 tons, contrasted with 22,250 tons in 1918 —the totals being 105,182 tons and 170,470 tons in the two years respectively. Including self-consumption, the output of 90 p.c. benzol, &c., was 118,056 tons, as compared with 181,088 tons in 1918.

COAL-TAR PRODUCTS IN AUSTRALIA.

The Sydney correspondent of the "Chemical Trade Journal" states that the Minister of Customs, in his recent tariff speech, referred to the mine of wealth in coal-tar and its bye-products, and mentioned that the Government proposed to protect the whole of them, except in the case of certain dyes. The Government are anxious to see the industry grow; and the proposed alterations in the tariff should give sufficient encouragement to those concerned to pay much greater attention to the matter. A comparison of the 1914 tariff rates for certain coal-tar products with rates in the new tariff (British preferential, intermediate, and general tariffs) shows the amount of protection now offered :

	1914 Tariff.	
	U.K.	General.
Benzol (per gallon)	½d.	1d.
Naphtha (per gallon)	½d.	1d.
Naphthalene (*ad val.*)	free	5 p.ct.
Naphthalene (n.e.i.)	25 p.ct.	30 p.ct.
Coal-tar oils	free	5 p.ct.
Carbolic and cresylic acid	free	5 p.ct.

	1920 Tariff.		
	British.	Intermediate.	General.
Benzol (per gallon)	5d.	7d.	8d.
Naphtha (per gallon)	5d.	7d.	8d.
Naphthalene (*ad val.*)	20 p.ct.	25 p.ct.	30 p.ct.
Naphthalene (n.e.i.)	25 p.ct.	30 p.ct.	35 p.ct.
Coal-tar oils	10 p.ct.	15 p.ct.	20 p.ct.
Carbolic and cresylic acid	25 p.ct.	30 p.ct.	35 p.ct.

The above rates provide a convincing reason why the waste of coal resources should soon be a thing of the past. There is need for prac-

Main's "Housing" Cookers.

HOUSES are building slowly yet surely, and the Government Department concerned with the nation's need in this respect has made its selection of cookers suitable for present and future schemes.

The Main "Surrey" Cooker on stand was an early choice, and this popular Stove has already been supplied in large numbers to those districts fortunate enough to have schemes certificated by Government.

The design, dimensions, finish, and price of the "Surrey" Cooker make it ideal in every respect.

May we send you our "Housing Problems" booklet. It will assist you with the Housing Schemes in your District.

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SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W.1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 97, Millfield, BELFAST; 6, Narrow Wine Street, BRISTOL; 333, Queen Street, MELBOURNE.

tically all the bye-products; and inquiries made in Melbourne from manufacturers and others have fully established the fact that the need is not confined to Sydney. There is a large demand for naphthalene, toluene, and solvent naphtha. Carbolic acid and disinfectants of other types are in continual use, in large quantities, and liquid fuel will be required to a greater and greater extent. Carbolic acid has been manufactured in Australia since the war; but the representative of a big firm of manufacturing chemists stated that it was impossible as yet to obtain a sufficient supply of the "middle oils" from tar distillation, as the distillation process was frequently not carried far enough under present conditions. There would now be a greater demand than ever for these middle oils, and greater need for the development of the coal-tar industry.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 28.

In the tar products market pitch maintains its firm tone; there being plenty of buyers for next season's delivery. Business is possible at over 170s. per ton net f.o.b. makers' works. Tar oils are in request; creosote being worth 1s. 2d. to 1s. 3d. per gallon. Solvent naphtha (95-160), pure benzol, and pure toluol are all about 3s. 6d. per gallon.

In sulphate of ammonia, there is nothing new to report.

Tar Products in the Provinces.

June 28.

The average values for gas-works products during the week were: Gas-works coal tar, 99s. to 104s. Pitch, East Coast, 160s. to 165s. per ton f.a.s.; West Coast—Manchester, 145s. to 150s.; Liverpool, 145s. to 150s.; Clyde, 145s. to 150s. nominal. Benzol 90 p.ct. North, 2s. 6d. to 2s. 7d.; crude 65 p.ct. at 120° C., 1s. 8d. to 1s. 9d. naked at makers' works; 50-90 p.ct. naked, North, 2s. 4d. to 2s. 6d. Toluol, naked, North, 2s. 6d. to 2s. 7d. nominal. Coal tar crude naphtha in bulk, North, 11½d. to 1s. Solvent naphtha, naked, North, 3s. 1d. to 3s. 3d. Heavy naphtha, North, 3s. 4d. to 3s. 6d. Creosote, in bulk, North, liquid, 11¼d. to 1s.; salty, 10¾d. to 11¼d. Heavy oils, in bulk, North, 1s. to 1s. 0¼d. Carbolic acid, 60 p.ct., 4s. to 4s. 1d. Naphthalene, £35; salts, £9 to £9 10s., bags included. Anthracene, "A" quality, 9d. per minimum 40 p.ct.; "B" quality, nominal.

Manchester District Tar Prices.

The publication last week (p. 800) of the average price realized for the sale of tar in the Manchester District for the months of April and May called the attention of numerous correspondents to the fact that the prices for February and March had not up to the present been reported. These figures, we learn, were: February, £4 18s. 7·57d.; March, £5 17s. 7·18d.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is practically nothing fresh to report with regard to the tar product markets. Prices, however, are maintained, although traders are not very anxious to look far ahead. The demand for pitch continues strong, and prices are still talked higher. There is good inquiry for export up to the end of the year. Total exports are so far already over 100,000 tons greater than a year ago. There is also much pitch being used for road-repairing purposes; and, as a consequence, there is said to be very little material still in stock. Tar is in a somewhat similar position. Solvent naphtha is fairly steady at last quoted rates, although slightly less has been accepted in some quarters. Supplies of heavy naphtha are not at all plentiful, and quotations remain firm. Naphthalenes constitute a difficult market, as many producers have found it does not pay to extract to the same extent as when the creosote was not so greatly needed. Crude is now quoted from £14 upwards, and refined about £40. The total production, without doubt, has been reduced by the high price of creosote, which now sells at up to 1s. 2d. per gallon. There is no material change in carbolic acid; but benzols are again a trifle dearer. Intermediates are about the same; but special interest is still shown in aniline oil and salts.

Latest quotations are as follows:

Benzol: 90% London 2s. 5d. to 2s. 7d., North 2s. 4d. to 2s. 6d.; 50-90% 2s. 3d. to 2s. 4d. London, 2s. 2d. to 2s. 3d. North; crude 60-65%, 1s. 6d. to 1s. 8d.; pure, 4s. per gallon naked.

Crude Tar: London, 87s. 6d. to 90s.; Midlands, 85s. to 87s. 6d.; North, 85s. to 90s. per ton *ex* works. Refined tar, 65s. per barrel (free) on rail.

Pitch: London, 165s. per ton; East Coast, 160s. to 165s. per ton; West Coast, 157s. 6d. to 165s., with Manchester 160s. per ton, and Glasgow 160s. per ton; South Wales, 170s. per ton.

Solvent Naphtha: London, 3s. 6d. Provinces average 3s. 4d. per gallon.

Crude Naphtha: Naked, 10d.; North, 9d. per gallon.

Heavy Naphtha: 3s. 6d. per gallon.

Naphthalene: Refined, £45 per ton nominal; inferior, £35; crude, £14 to £22, according to quality.

Toluol: Naked, 2s. 9d. per gallon nominal. North, 2s. 7d. Pure, 4s.

Creosote: London, 1s. 1d. to 1s. 2d.; North, 1s. 1d.; heavy oil, 10¼d. per gallon in bulk.

Anthracene: 40-45%, 9d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

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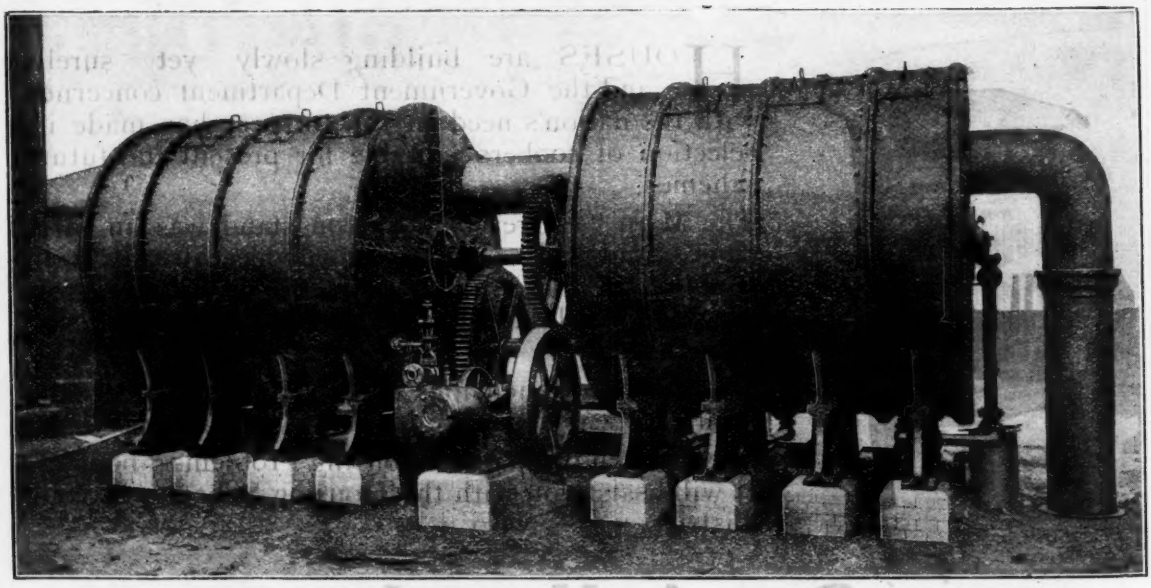

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Aniline Oil: 1s. 9d. to 1s. 10d. per lb., drums extra.
Aniline Salts: 2s. to 2s. 2d. per lb.
Cresylic Acid: 95%, 4s. 9d. to 5s. 3d.; 97-99%, 5s. 3d. to 5s. 6d. per gallon *ex* works London, f.o.b. other ports.
Carbolic Acid: Crude 60%, 4s. 8d. per gallon; crystals 40%, 1s. 5d. to 1s. 6d. per lb. (nominal).
Salicylic Acid: Technical, 3s. 0d. to 3s. 3d.; B.P., 3s. 9d. per lb.

Sulphate of Ammonia.

There is not much to report in this market. Home requirements are not great, apart from the Irish demand, which is now on. Makers, of course, wish to export as much as possible during the summer. The export demand is heavy, as much as £48 being offered in some quarters.

Chorley Gas-Works Accounts.

In his second annual report to the Chorley Corporation Gas Committee, Mr. Mark Newsome (the Engineer and Manager) says that a net profit on the gas-works for the year ended March 31 of £983 compares with a net loss a year ago of £2467. The amount of war bonus paid to the employees during the year was £5474, equivalent to 7·09d. per 1000 c.ft. of gas sold. This bonus figure is in excess of the total annual wages bill before the war. The production of gas was 199,991,000 c.ft., as compared with 168,728,000 c.ft. for the previous year; the increase being equal to 18·52 p.ct. The unaccounted-for gas showed a slight falling-off, at 7·46 p.ct. The quantity of coal used was 12,483 tons, which was only 10 tons in excess of the year before, though there was actually sold 29,500,000 c.ft. more gas than in the corresponding period. Particularly during the winter period, the stocks of coal held in reserve became perilously low; and for weeks there was less than seven days' fuel in the stores. On March 6 last, the stores were entirely emptied; and but for the receipt of a special supply on the Coal Controller's direct instructions, the town would have been in darkness. The average yield of gas per ton of coal carbonized was 16,021 c.ft., as compared with 13,527 c.ft. last year—an increase of 2494 c.ft. "If this improvement had not been forthcoming," says Mr. Newsome, "we should have required 2301 tons of fuel more than we actually used to have met the annual consumption. In view of the inadequate deliveries of fuel experienced, I feel sure such an increased tonnage would not have been obtained; and for some period at least only an intermittent supply of gas would have been available." The quality of the fuel, too, has been most unsuitable. Owing to the scrapping of a boiler, and the absence of a replacement, it was not possible to operate the carburetted water-gas plant during the winter.

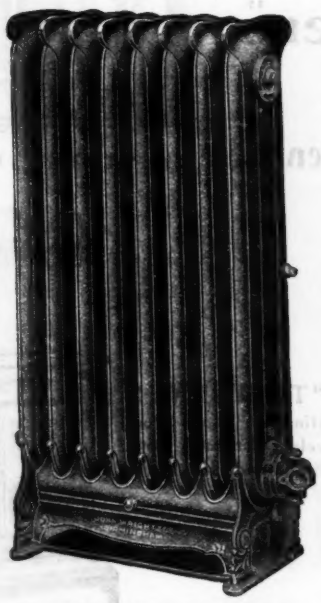
The Chesterfield Gas and Water Board decided to stand by the Federation of Gas Employers in regard to the action of the Union in tendering notices to cease work.

Hinckley Gas-Works Report.

At a meeting of the Hinckley Urban District Council on Tuesday last, Mr. Fred Lee (the Gas Manager) presented the annual report of the gas undertaking, which showed that the total income for the year was £35,239, of which £23,314 was for gas, and £8572 for coke. The net profit was £1373, and the total average charge per 1000 c.ft. for the year was 3s. 6·55d. The actual amount received for gas showed 43·20 p.ct. increase over 1914. The total gas manufactured was 135,112,000 c.ft. compared with 122,582,000 c.ft. last year—an increase of 12,530,000 c.ft., or 10·22 p.ct. This was by far the greatest increase they had had in one year. The gas used in houses and shops through quarterly meters was 44,853,500 c.ft., and consumers with slot meters used 38,815,000 c.ft. The total consumption of gas for the year was 131,475,400 c.ft., compared with 118,831,500 c.ft.—an increase of 12,643,900 c.ft. or 10·64 p.ct. The gas unaccounted-for during the past 15 years had only averaged 1·71 p.ct. The consumption of gas had increased 32·53 p.ct. since 1914; and to meet the increasing demands, it would be necessary to make considerable extensions to the works. At the present time new boilers and water-gas plant were on order. When these were at work, they would be a great help; but in spite of this, the carbonizing plant and other apparatus must at an early date be extended. Mr. Bott, moving the adoption of the report, congratulated Mr. Lee on the satisfactory state of things. If the threatened strike of gas workers was decided upon, they in Hinckley who depended upon hand stokers would be brought to a standstill. On the other hand, if the increase of 10s. was granted, it would mean that they would be compelled to raise the price of gas by 4d. per 1000 c.ft. The report was adopted.

Londonderry Rioting and the Gas Supply.—Exact reports of what has been happening in Londonderry during the past week are naturally impossible to come by until things settle down again. It seems, however, that every effort was made to maintain the gas supply, and that it was only when heavy sniping went on during Wednesday evening near the gas-works that work was brought to a standstill. Subsequently, to the city's other troubles was added that of being without gas. An attack on the works by a mob of 300 men was frustrated by the military, who entrenched themselves, and having driven off the attackers took possession of the works. Although serious inconvenience arose, it may be noted that industrial work generally would have been suspended in any case. On Saturday steps were taken towards an understanding between the rival parties, and work has been resumed on a gradual basis.

During shunting operations at the Swan Village Gas-Works of the Birmingham Corporation, two men who were removing coal trucks were caught between the buffers and crushed. One was killed instantly; and the other was taken to hospital seriously injured.



The "St. Andrew" Gas-Steam Radiator.

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Gas-Steam RADIATOR.

Manufacturing difficulties are still great. Customers should be advised to arrange for their Winter-warming requirements as soon as possible.

An early order is necessary to ensure early delivery, and will allow more time for fixing, so that the installation will be ready for use directly and whenever the cold weather may come.

The "St. Andrew" Radiator is easily installed. It is so durable as to last a lifetime. Once lighted, it works automatically; requires no attention; makes no noise or smell; and incurs no danger.

There is a constant reliable supply of agreeable, healthy heat. Gas consumption is economised by a patent automatic valve. It prevents waste.

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JOHN WRIGHT & CO.,
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South Metropolitan Company's Memorial Convalescent Home.

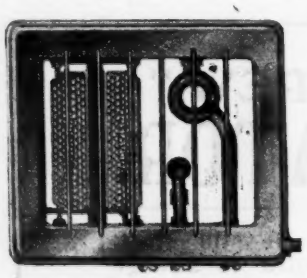
In 1918, Dr. Charles Carpenter mentioned to the Co-Partnership Committee of the South Metropolitan Gas Company that the Directors intended to erect a memorial to fallen co-partners; but no indication was then given of the form which the memorial might possibly take. Later on it was suggested that a convalescent home at Mundesley-on-Sea would be an ideal scheme. The suggestion was adopted; and the requisite steps were taken to realize the ideal. Near Mundesley Station there was a property very suitable for the purpose—a detached house in extensive grounds; and this property, including five acres of land, has been acquired by the Company. The buildings have been adapted and extended so as to form a home of rest, with accommodation for about twenty convalescents and the necessary staff. A description of the home and its surroundings, by Mr. Walter T. Layton, which, with some photographs, appears in the June issue of the Company's "Co-Partnership Journal," shows what an excellent choice has been made, both as to the form the memorial should take and as regards the situation of the home. It was, indeed, as Mr. Layton says, a happy thought "to commemorate 'the glorious dead' by doing something to alleviate the sufferings of stricken survivors of the great horror." The home is now open to receive convalescent co-partners. Application should be made to the Engineer of the Station or Chief Officer of the Department in which the applicant is employed. The Company's Medical Officer (Dr. Oswald) will examine each case, and decide as to its suitability for the home, and as to the order in which the waiting cases will be admitted. An applicant whose own medical attendant has advised convalescent-home treatment must produce a letter from his doctor when he makes his application.

Bradford Gas-Works Profit.—At a meeting of the Bradford Gas Committee on Friday last, it was stated that the gas undertaking showed a profit of £55,000 for the year ended March 31, as against the previous year's profit of £670, following a number of years in which there have been deficiencies. The accumulated deficiency on profit and loss account was £58,000; so that the profit of the past year reduced the deficit to £3000. It is understood that this remaining adverse balance has been more than wiped out since March. Before charging interest and sinking fund, the gross profit was £118,000. This result has been achieved despite the reduction of 10d. per 1000 c.ft. to domestic consumers during the past three months of the year, after the fall in the price of coal. The sale of gas is stated to have realized £370,000—an increase of £82,000. This was due partly to the increased price from 4s. to 4s. 10d. per 1000 c.ft., and partly through the increased output. The income from coke and residuals has increased by £32,000. The capital expenditure on the gas undertaking was £1,300,000, of which nearly half has been paid off. During the past year, the allowances to dependants of soldier employees have decreased from £9200 in the previous year to £1350, consequent on the return of most of the men.

A Warning from the United States.

The disastrous result of an attempt to secure a too cheap gas supply was recorded in a recent issue of an American paper—the "Gas Record." It relates to Galena, the oldest city in Illinois, which is now without gas, and the plant (after seventy years' useful service) is being dismantled. Failure to receive a remunerative rate for the gas, led to the appointment of a Receiver about a year ago; and subsequently the plant was sold by the Sheriff. The circumstances being as they are, efforts to interest new capital have naturally proved fruitless; for investors have before them the warning of the confiscation of over $100,000 of capital which had been devoted to public service. The plant now closed-down was started in 1860; and a feature of the undertaking was the fact that the greater part of the mains was laid in solid rock. Up to 1909, the Company (serving practically only residential customers) were charging $2.50 per 1000 c ft. for gas; but the rate was then voluntarily reduced to $2. Later there was an agitation for cheaper gas; and, in spite of the declaration of experts that a further reduction was impossible with the conditions prevailing at Galena, a delegation appeared before the State Utilities Commission, and secured a reduction to $1.75 per 1000 c.ft. Unable, at this price, to make both ends meet, the Company were at last compelled to file a petition in bankruptcy, and to leave without gas 450 homes, which up to then they had been supplying. All these householders, it is pointed out, had considerable sums of money invested in gas ranges, heaters, various cooking appliances, and lighting apparatus; and so they have sustained heavy loss. In addition, they have now to buy expensive oil and coal equipment. Business men declare it is the most serious calamity that has ever befallen Galena, and that everyone will feel the effect of the blow in the way of depreciated property values.

Last Year's Results at Spalding.—A net profit of £2445 on the working of the Spalding Urban District Council Gas Department for the year ended March 31 is reported by the Engineer and Manager (Mr. H. Blakey) in his annual statement to the Gas Committee. This compares with a net loss of £2290 on the previous year's working. This result he regards as very gratifying, considering the increases granted to the employees during the year, the increased cost per ton of coal, and the higher price that has had to be paid for all materials used. The make of gas per ton of coal carbonized constituted a record for the undertaking; and, in consequence of this, though the stokers' wages were increased considerably during the year, the cost per ton of coal carbonized was actually reduced by 2·39d. The income from residuals increased to the extent of 4s. 8·82d. per ton of coal carbonized. The quantity of gas made was 60,192,000 c.ft., compared with 54,405,200 c.ft. for the previous year; while the make per ton was 14,497 c.ft., against 13,493 c.ft. Mr. Blakey points out that the make per ton would have been still larger had it been possible for him to adopt steaming. The inadequate supply of steam on the works is drawn attention to in the report.



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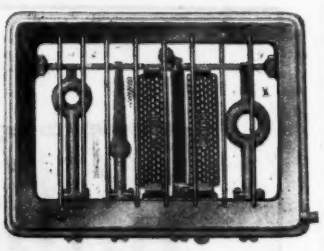
Compact and Efficient.



The "TWEEN" Hot-Plate.

The "WEE" with Stand and Plate Rack.

"TWEEN" No. 1 with Stand and Plate Rack.

"TWEEN" No. 2 (finished Green Porcelain Enamel) with Stand and Plate Rack.

The Davis Gas Stove Co., Ltd.,

SALES DEPT.: 60, OXFORD STREET, LONDON, W. 1.

Audlem Public Lighting Question. — The Parish Council of Audlem, at a meeting held last week, discussed the question of the public lighting of the area. The opinion prevailed that the cost of repairs to lamps, and the cost of lighting next season, would be very high. It was therefore decided that, in the interests of economy, it would be undesirable to proceed with the scheme.

Roadside Supplies of Benzol.—Benzol may now be obtained by motorists at the roadside. Recently a roadside filling station was opened by the Automobile Association and Motor Union on the Bath Road, near Newbury. The success attending this experiment was immediate; and now a second station has been inaugurated at Coombe Hill, on the road between Worcester and Gloucester.

Patent Screening and Washing Machines.—Among the exhibitors in the Concrete Machinery Section at the Royal Show, Darlington, are the Liner Concrete Machinery Company, of Newcastle-upon-Tyne, who are showing their patent screening and washing machines. In exhaustive coke-washing experiments with the latter, there has been obtained an efficiency of 100 p.ct. of bats and sinkers, and consequently the same efficiency of floating coke. The Harrison washing machine will deal with materials both heavier and lighter than water—including coke, coke breeze, coal clinker, &c. The same materials can be treated by the Thompson patent revolving screen and separator. It does not clog, cannot be overloaded, has small wear and tear, and the feeding arrangement is very simple.

A slight fire occurred at a Sheffield hotel through the wire of an electric radiator in a private sitting-room fusing and setting fire to the curtains. The brigade arrived on the scene; and the fire was out within a few minutes.

The Blackburn gas undertaking last year made a net profit of £4738, against £12,710 in 1919. The reduced profit is accounted for by the fact that, while the price of gas remained at the same rate, there had to be met an increased expenditure on coal of £17,242, wages £10,294, and mains and services renewals £7922.

An issue of £8250 of 7 p.ct. redeemable debenture stock (at a minimum price of par) is being offered by tender, on behalf of the Directors of the Bognor Gas Light and Coke Company, by Messrs. A. & W. Richards, of No. 37, Walbrook, E.C. The stock is to be redeemed at par on July 1, 1930. Tenders should be sent in by next Friday morning.

In connection with the proposal of the Stoke-on-Trent Town Council to acquire the Potteries undertaking of the British Gas Light Company, a Sub-Committee, consisting of the Chairman of the Gas Committee (Mr. C. H. Bowers), the Vice-Chairman (Alderman T. Mitchell), and Mr. T. Thornton, has been appointed to interview the Company, and to report from time to time to the Gas Committee.

The price of gas has been fixed by the Dundee Corporation Gas Committee at 3s. 2d. per 1000 c.ft. Compared with the pre-war rate, there is shown an increase of 50 p.ct., which is chiefly attributable to the higher cost of coals.

The Bingley District Council have advanced the price of gas and electricity, from July 1. The financial statement for the year ended March 31 last shows that the sale of gas was 128,081,800 c.ft., an increase of 10,000,000 c.ft., but, owing to the greatly increased working costs, there was a loss of £955 on the year.

At Bradford, last Tuesday, Arthur Cliffe, a labourer, was sent to prison for three months' hard labour, for stealing from an unoccupied house a quantity of gas-fittings, chandeliers, &c., of the value of £10, left in the house when the occupier moved away some time ago. The property was missed, and was traced to the prisoner, who had been going about the city as a rag gatherer.

The Burnley Corporation are grading their officials and reviewing their salaries. Under the scheme, the salary of Mr. J. P. Leather (the Gas Engineer), who is now getting £819 10s., is to be increased to £850, with annual advances of £50 to a maximum of £1000. Mr. J. H. Clegg (the Deputy Gas Engineer), whose salary is £419 10s., is to receive £450, rising by £50 annually to £550.

Brunner, Mond, & Co., Ltd., have, by arrangement with the Government, formed a separate company, to be known as "Synthetic Ammonia and Nitrates, Ltd.," with a capital of five millions sterling, to carry on the work of erecting and operating the factory and plant on the site at Billingham, which has been acquired from the Ministry of Munitions. The whole of the staff engaged by Messrs. Brunner-Mond for the work of their nitrogen fixation department has now been transferred to Billingham.

The Chancellor of the Exchequer has informed the Federation of British Industries that he will meet their representatives on July 1 in order to discuss the concessions to the Excess Profits Duty which have been recommended by the Federation. The Federation at the same time will place before the Chancellor of the Exchequer the information at their disposal with regard to the present position and the effect that the taxation proposals in the Finance Bill, 1920, is already having on the trade and industry of the country.

An issue at par is announced of 250,000 ordinary shares of £1 each in Low-Temperature Carbonization, Ltd. In a notice accompanying the prospectus, the Secretary (Mr. James H. Macaulay) states that, to cope with the enormous demand for oil fuel, motor spirit, and smokeless fuel, the Company are rapidly enlarging the capacity of the Yorkshire works. Within the next few months, the output of these commodities will be substantially increased. Negotiations are now pending for the erection of further central low-temperature carbonizing stations with important industrial interests, which will result in the manufacture on a large scale of smokeless solid fuel for domestic consumption, oil fuel, motor spirit, and power gas, for burning under boilers for generating electric power.

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STOCK MARKET REPORT.

THE week just closed on the Stock Exchange was dull and uninteresting. Only here and there could a market be noted with any backbone in it. Uncertainty and apprehension in regard to the national finance were the chief factors of depression, with perhaps one or two others to help. Things are likely to remain in this condition until the Budget is an accomplished fact, and we know the best and the worst of it.

The gilt-edged market was flat. Home Government issues were weak. Friday's figures were: Consols 46⅝-46⅞, War Loan 84 3/16-84¼, Funding 68¾-69¾, Victory 76¼-77. National bonds, Indian and Colonial loans, and Municipal issues were also down. Home Rails were among the firmest, though even they were getting a bit ragged by the close. Canadians were firmer; but Argentines were easier.

The Foreign Market was stronger, aided by improving exchanges. French, Belgian, Greek, and Brazilian were better; and a marked feature was the rise in Russian 5 p.ct.

The Miscellaneous Market had many weak points. Rubbers moved irregularly, and Oils lacked support. Shipping, Insurance, Textiles, and Iron and Steel were all lower.

Business in the Gas Market was rather more active, and transactions more evenly shared in by the undertakings of lesser note. If the Gas Regulation Bill has a successful passing through the Commons to-day on report, some quickening of interest in the market may be expected. The general tone last week was good. The London companies were firm and unchanged. In the Suburban and Provincial group, Alliance and Dublin rose 5; but South Suburban was 2 down. Prices of Imperial Continental were unchanged; but the quotation was put down 1. The quotations of nine debenture stocks were adjusted to the *ex div.* position.

Bargains done for cash during the week were as follows: On Monday, Alliance and Dublin 40, Commercial 4 p.ct. 55¼, European 5⅜, Gas Light ordinary 52, 52¼, 53, 53¼, ditto debenture 47⅞, Imperial Continental 124, 124½, 125, 125⅛, 125⅜, 126½, 127, ditto debenture 82½. Liverpool 57 7/16, Primitiva 18s. 6d., South Metropolitan 54, Tottenham "B" 52. On Tuesday, Commercial 3½ p.ct. 46, Continental Union 29, 29½, Gas Light ordinary 52⅛, 52⅜, 53, 53¼, 53⅜, ditto preference 57⅛, ditto debenture 47, 47¼, Imperial Continental 125⅜, 126, Primitiva preference 36s., Cartagena (Columbia) 26s. 3d. On Wednesday, Gas Light ordinary 52½, 53⅛, ditto preference 56½, ditto debenture 48, Imperial Continental 125⅛, South Metropolitan 52, 53, 54, Tottenham "B" 52½. On Thursday, European 5⅛, Gas Light ordinary 52, 52⅛, 52⅜, Imperial Continental 124½, 125½, ditto debenture 82½, Primitiva debenture (1911) 47½, 47⅝, South Metropolitan 54. On Friday, Alliance and Dublin 46¾, Bournemouth 10 p.ct. 8, 8 3/16, British 24⅜, Commercial 4 p.ct. 53¼, ditto 3½ p.ct. 45⅝, 45⅞, Gas Light ordinary 53, 53⅛, 53¼, 53⅛, 53⅜, 54, Monte Video 74, South Metropolitan 53½, Tottenham "B" 52½, 52¾.

In the Money Market, the usual requirements for the end of the half year increased the demand; but there was no very inconvenient degree of tightness. Discount rates remained steady throughout. Silver advanced slightly. The Bank rate is 7 p.ct., as fixed on April 15.

A mouse on the switchboard at the electricity works resulted in Kingston being deprived of current for several minutes one night last week.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Mar. 11	4	4%	Aldershot 4 p.c. Pref. .	...	58—63	...
1,551,868	,,	Mar. 26	2½	3 1/3%	Alliance & Dublin Ord.	59—64	42—47	40—46½
374,000	,,	Jan. 15	4	4%	Do. 4 p.c. Deb.	76—79	57—62	...
280,000	5	May 13	7½	8%	Bombay, Ltd. . . .	5¼—6¼	4½—5½	...
50,000	10	Feb. 26	16	10%	Bournemouth Gas and Water { 10 p.c. . .	29—30	8¼—9	8—8 3/16
383,110	10	,,	7	7%	B 7 p.c. .	15—15½	9—10	...
115,000	10	,,	6	6/-	Pref. 6 p.c.	13¼—14	8—9	...
162,065	—	June 25	—	4%	4 p.c. Deb.	...	62—64*	...
992,045	Stk.	Feb. 12	14	30/-	Brentford A Consolid. .	261—266	47—52	...
734,920	,,	,,	11	26/3	Do. B New . .	204—209	45—50	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref. .	109—111	70—75	...
221,400	,,	June 10	4	4%	Do. 4 p.c. Deb. .	91—93	63—65	...
214,775	,,	Mar. 11	11	7½%	Brighton & Hove Orig. .	208—213	121—126	...
244,200	,,	,,	8	5¼%	Do. A Ord. Stk.	154—159	80—85	...
1,287,500	Stk.	Feb. 26	5	5%	Bristol 5 p.c. max. . .	...	...	...
530,000	20	April 14	12½	10%	British	44—45	24—26	24¼
120,000	Stk.	June 25	4	4%	Do. 4 p.c. Deb. Stk.	88—90	37—39*	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	45—48*	...
100,000	10	May 27	—	—	Cape Town & Dis., Ltd.	1¼—2¼	7—7½	...
100,000	10-	,,	—	4½%	Do. 4½ p.c. Pref. .	4—6	5¼—6¼	...
100,000	Stk.	June 25	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	56—61*	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord. . .	108—110	...	...
1,513,280	,,	Feb. 26	5/9/4	33/4	Commercial 4 p.c. Stk.	106—108	51—56	53¼—55¼
560,000	,,	,,	5¼	26/8	Do. 3½ p.c. do.	103—105	44—49	45¼—45¾
475,000	,,	June 10	3	3%	Do. 3 p.c. Deb. Stk.	69¼—71¼	45—47	...
800,000	,,	Dec. 11	4	—	Continental Union Ltd.	76—79	27—32	29—29¼
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	40—60	...
51,600	,,	Feb. 26	14½	10½%	Croydon A 10 p.c. .	...	130—140	...
278,400	—	,,	11½	7½%	Croydon B and C 7 p.c.	...	90—100	...
492,270	Stk.	—	6	5%	Derby Con. Stk. . . .	123—125	...	...
55,000	,,	—	4	4%	Do. Deb. Stk. .	102—104	...	...
1,002,180	10	Jan. 29	10	5/0	European, Ltd. . . .	17¼—18	5¼—6¼	5¼—5¾
16,298,975	Stk.	Feb. 12	4/17/4	30/-	Gas Light and Coke { 4 p.c. Ord. . .	98—102	52—55	52—54
2,600,000	,,	,,	3½	26/8	3½ p.c. max. .	76—79	37—42	...
4,062,235	,,	,,	4	4%	4 p.c. Con. Pref.	96—99	55—58	56¼—57¼
4,674,850	,,	June 25	3	3%	3 p.c. Con. Deb.	72¼—74¼	45—48*	47—48
130,000	,,	Dec. 11	10	10%	10 p.c. Bonds. .	...	...	...
82,500	,,	Mar. 11	5	3 1/3%	Hastings & St. L. 5 p.c.	...	55—60	...
258,740	,,	,,	3½	2 1/3%	Do. 3½ p.c.	87—89	38—43	...
70,000	10	May 13	11	7%	Hongkong & China, Ltd.	16¼—16½	8½—9½	...
86,600	Stk.	Mar. 11	9	6 1/3%	Hornsey 7 p.c. . . .	...	88—93	...
131,000	,,	,,	7½	5 1/3%	Ilford A and C . . .	151—154	86—91	...
65,780	,,	,,	6½	4 1/3%	Do. B	115—118	65—70	...
65,500	,,	June 25	4	4%	Do. 4 p.c. Deb. . .	92—94	55—58*	...
4,949,000	,,	May 14	9	4 1/3%	Imperial Continental .	150—160	124—129	124—127
1,235,000	,,	Feb. 12	3½	3 1/3%	Do. 3½ p.c. Deb. Red.	84—86	80—85	82¼—82½
235,242	,,	Mar. 26	6½	5 1/3%	Lea Bridge Ord. 5 p.c. .	119—121	80—85	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A.	211—213	...	57 7/16
					B.	146—148		
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	...	...	...
165,736	,,	Feb. 26	7/5/6	31 1/3%	Maidstone 5 p.c. . . .	...	52—57	...
75,000	5	June 11	6	3%	Malta & Mediterranean	4¼—4½	1¾—2¼	...
250,000	100	April 1	4½	4 1/3%	Met. of Melbourne { 4½ p.c. Deb.	99—101	89—96	...
541,920	Stk.	May 27	4	6%	Monte Video, Ltd. . .	11¼—12	70—75	74
1,875,892	,,	Feb. 26	4½	3 1/3%	Newcastle & Gatsh'dCon.	98½—99½	61½—62	...
529,705	,,	Dec. 30	3½	3 1/3%	Do. 3½ p.c. Deb.	82—83	52—53	...
15,000	10	Mar. 11	—	8%	North Middlesex 10 p.c.	...	13—13½	...
55,940	10	,,	7/14/0	61 1/3%	,, ,, 7 p.c.	14—15	7¼—8¼	...
300,000	Stk.	May 13	8	8%	Oriental, Ltd. . . .	117—122	102—105	...
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd. . . .	7¼—7¾	3—4	...
60,000	50	Mar. 11	13	7 1/3%	Portsea Island, B . .	128—131	66—71	...
100,000	50	,,	12	6 2/3%	Do. C . .	118—121	53—58	...
249,980	5	April 29	8	—	Primitiva Ord. . . .	5¾—6	1—1¼	18/6
499,960	5	June 26	5	—	Do. 5 p.c. Pref. .	4¼—5	1¼—2¼	36/-
521,600	100	June 1	4	4%	Do. 4 p.c. Deb. .	91—93	69—71	...
600,000	Stk.	Jan. 29	4	4%	Do. ,, ,, 1911	...	47—50	47¼—47½
346,198	,,	June 25	4	4%	River Plate 4 p.c. Deb.	85—87	45—48*	...
150,000	10	Mar. 26	6	6/-	San Paulo { 6 p.c. Pref.	10¾—11	7¼—7¾	...
125,000	50	Dec. 30	5	5%	5 p.c. Deb.	47—49	39—41	...
135,000	Stk.	Mar. 11	10	50/-	Sheffield A	223—224	68—73	...
209,984	,,	,,	10	4 1/3%	Do. B	222—224	58—63	...
523,500	,,	,,	10	35/5	Do. C	220—222	54—57	...
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c. . .	...	...	...
90,000	10	June 25	9	9%	South African . . .	10¼—11¼	11¼—12¼*	...
6,609,895	Stk.	Feb. 12	5/4/0	30/-	South Met. 4 p.c. Ord..	111—113	52—55	52—54
250,000	,,	Jan. 15	—	5%	Do. Pref. . .	...	93—95	...
1,895,443	,,	,,	3	3%	Do. 3 p.c. Deb..	72¼—74¼	45—48	...
224,820	,,	Feb. 26	3½	3%	South Shields Con. Stk.	157—159	99—101	...
1,087,795	,,	Aug. 14	6	3 1/3%	S'th Suburb'n Ord. 5 p.c.	114—116	62—67	...
247,558	,,	June 25	5	5%	Do. 5 p.c. Deb. Stk.	116—118	71—76*	...
647,740	,,	May 13	7½	3 1/3%	Southampton Ord. . .	99—102	57—60	...
121,275	,,	June 25	4	4%	Do. 4 p.c. Deb. Stk.	...	59—61*	...
120,000	,,	Aug. 14	—	3 1/3%	Tottenham District { A 5 p.c. .	135—138	60—65	...
782,275	,,	,,	6	2 1/3%	B 3½ p.c. .	115—117	50—55	52—52½
181,255	,,	June 10	4	4%	4 p.c. Deb.	87—89	60—63	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd. . . .	5—6	1—2	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	...
236,476	Stk.	Mar. 11	5	3 1/3%	Tynemouth 5 p.c. max.	108½—109	71—73	...
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 26	8½	55/-	Wandsworth A 5 p.c.	151—156	83—88	...
255,636	,,	,,	6½	40/-	Do, B 3½ p.c.	129—134	61—66	...
108,075	,,	,,	—	38/6	Do. C . . .	...	61—66	...
140,865	,,	,,	—	38/6	New Ordinary . . .	...	61—66	...
352,000	,,	,,	6½	33/9	Wimbledon 5 p.c. . .	117—122	60—65	...
98,000	,,	,,	6½	40/-	Epsom 5 p.c. . . .	121—126	60—65	...
88,416	,,	Dec. 30	3	3%	3 p.c. Deb. Stk. . .	66—69	44—47	...

* Ex Div.

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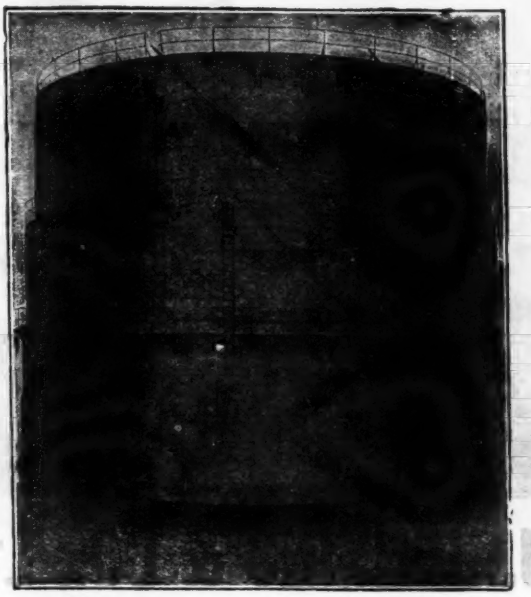

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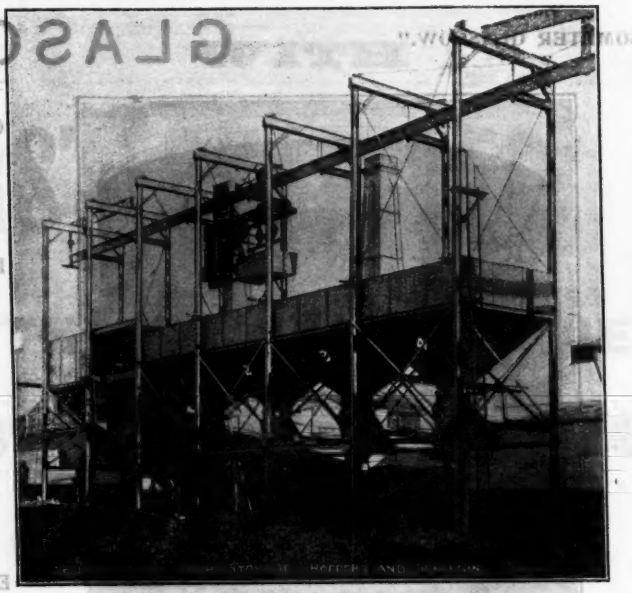

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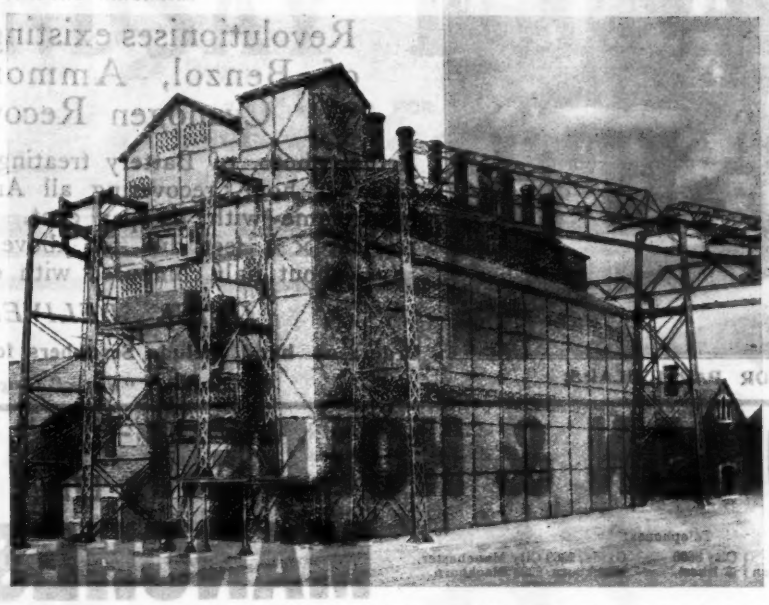

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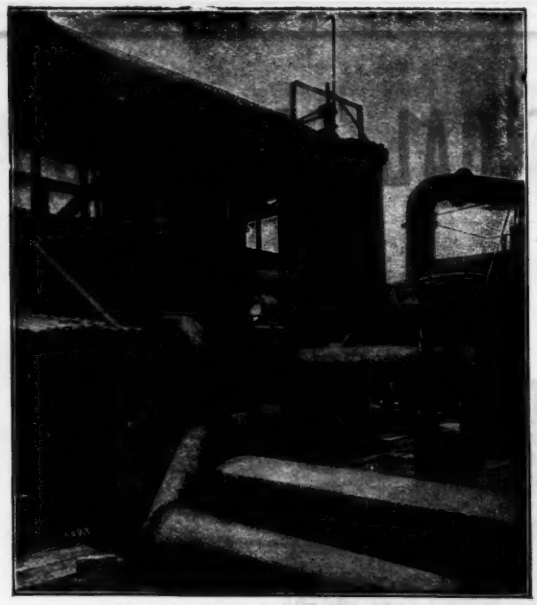

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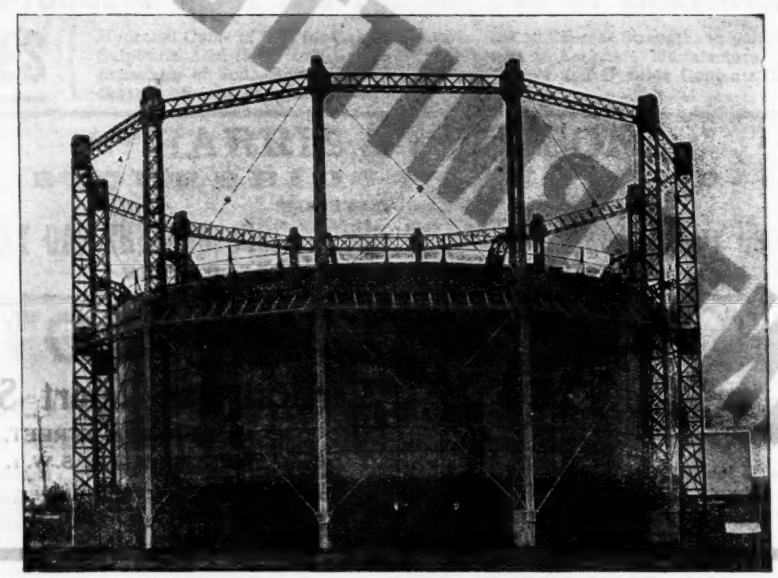

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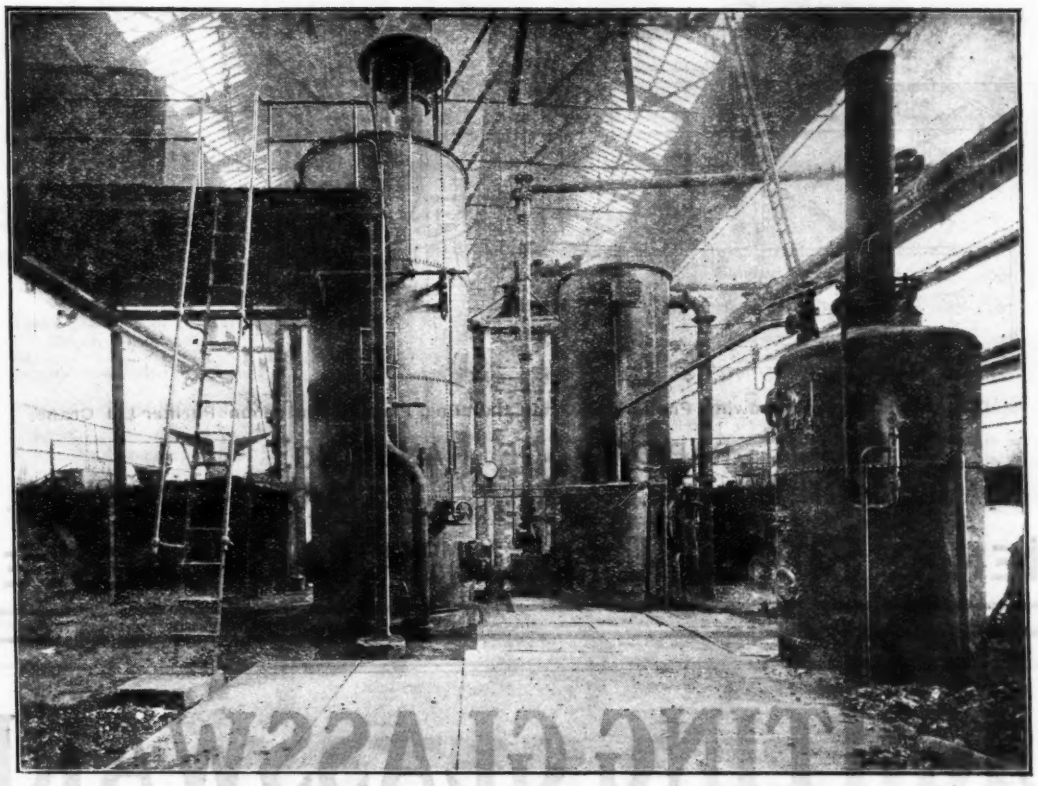

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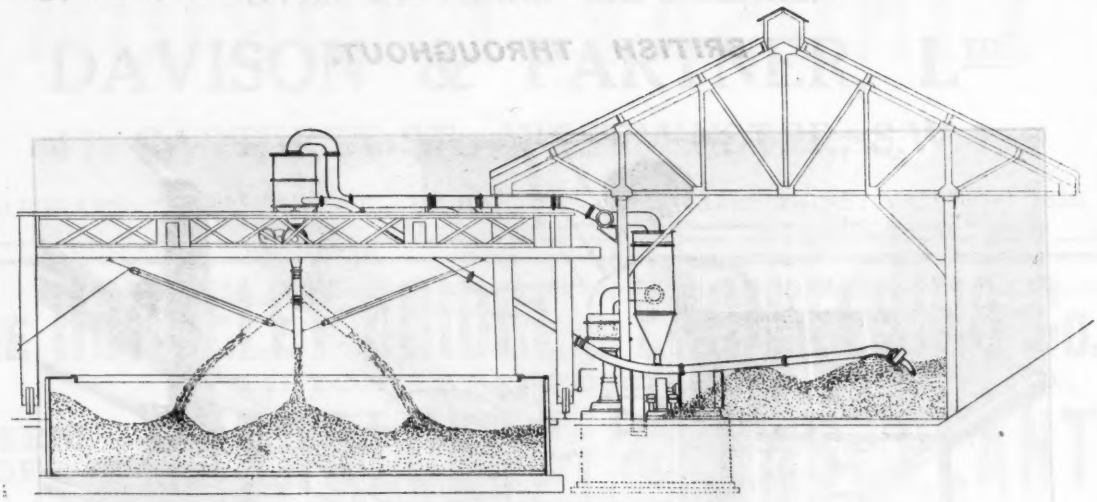

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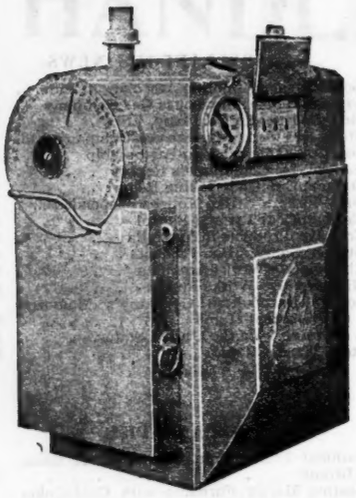

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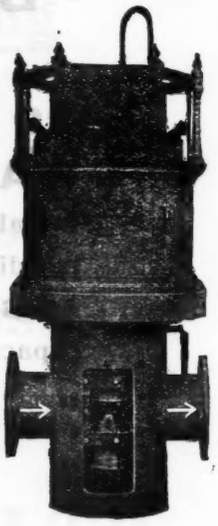

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L. C. EVANS,
Town Clerk.

PENRITH URBAN DISTRICT COUNCIL.

TAR.

THE Gas Committee of the above Council are prepared to consider TENDERS for the Purchase of the SURPLUS TAR produced at their works during the year ending June 30, 1921.

Tenders, endorsed "Tenders for Tar," must be Delivered to Mr. George Wainwright, Clerk, Town Hall, Penrith, not later than noon on Monday, July 5, 1920.

The Committee do not bind themselves to accept the highest or any Tender.

Further information may be obtained from

E. SHAUL,
Manager.

Gas-Works, Penrith,
June 25, 1920.

COMPANY NOTICES.

COMMERCIAL GAS COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company, SO FAR AS THEY RELATE TO CAPITAL STOCKS, WILL BE CLOSED from the 7th of July to the 6th of August, both days inclusive, and that Dividends will be paid on the 16th August next to the holders of Stock registered at the date of the closing.

By order of the Board,
F. J. BRADFIELD,
Secretary.

Offices: Stepney, E. 1,
June 17, 1920.

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MESSRS. A. & W. RICHARDS (William Richards) have been instructed by the Directors to issue the above BY TENDER on the 2nd of July, 1920.

Full Particulars and Forms of Tender may be obtained of Messrs. A. & W. RICHARDS, 37, WALBROOK, E.C. 4. Telephone: City 3833.

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Being a Comparison of the Provisions contained in the Model Bills, in Special and Municipal Acts, and in Provisional Orders, 1910 to 1914, relating to these Public Services.

Compiled and noted by

JACQUES ABADY,

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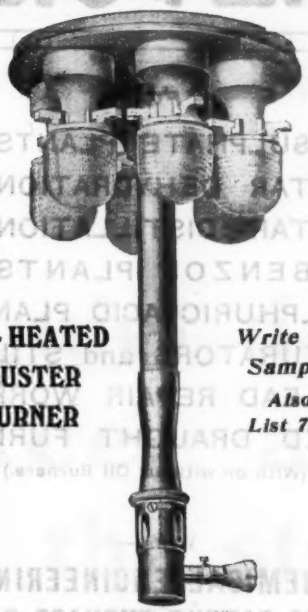

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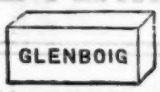
TRADE 

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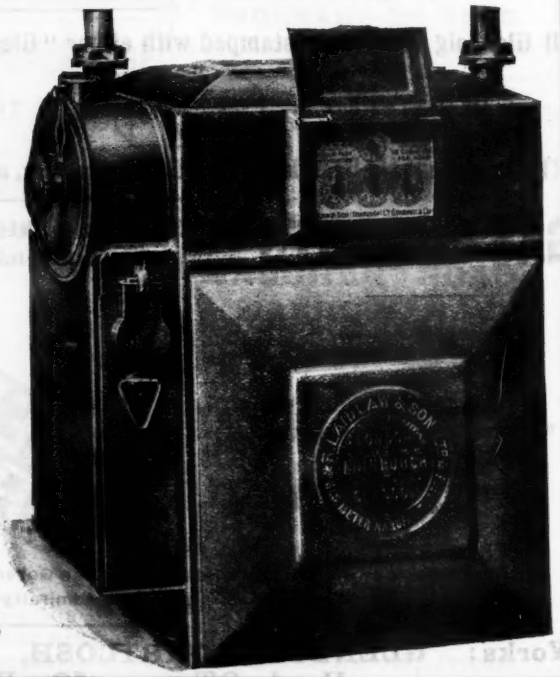

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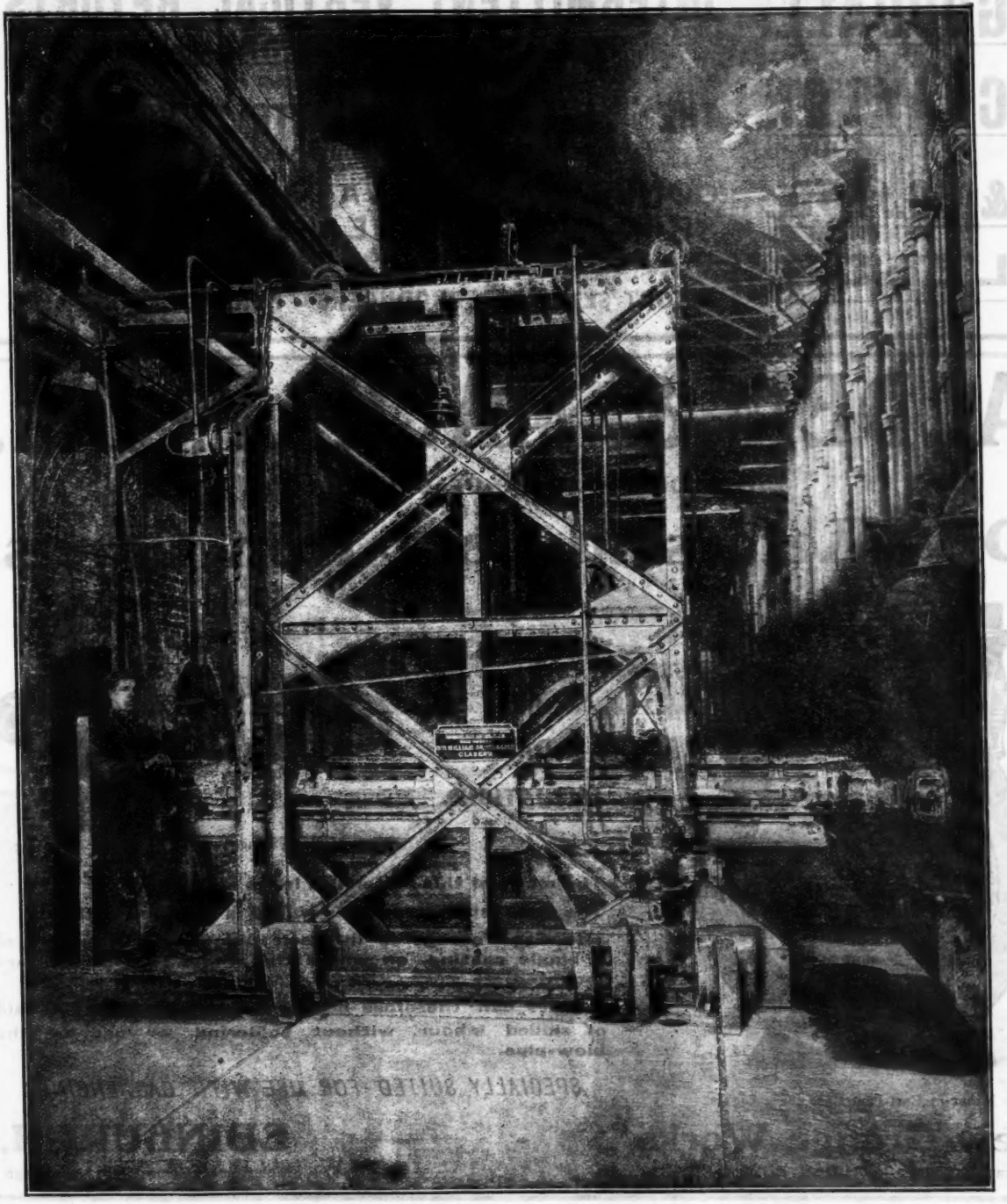

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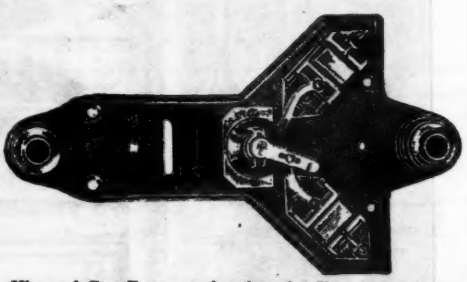

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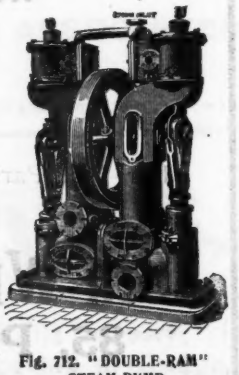
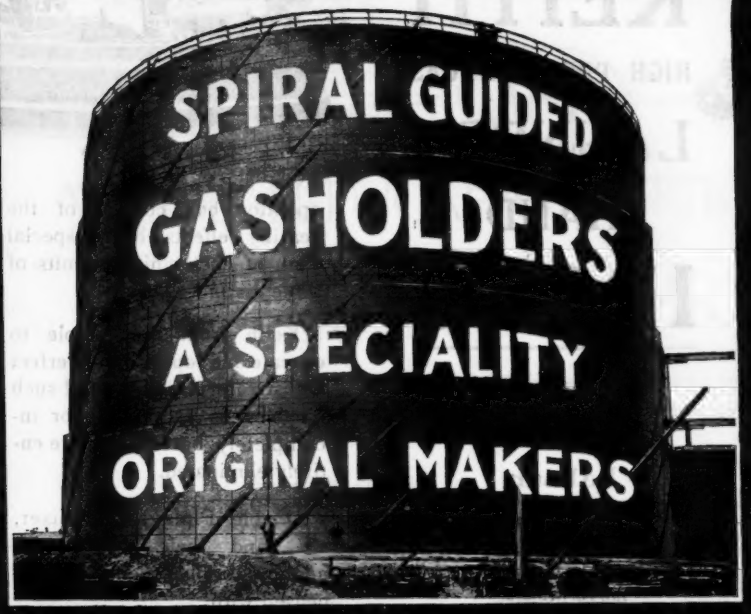


Fig. 712. "DOUBLE-RAM" STEAM-PUMP.



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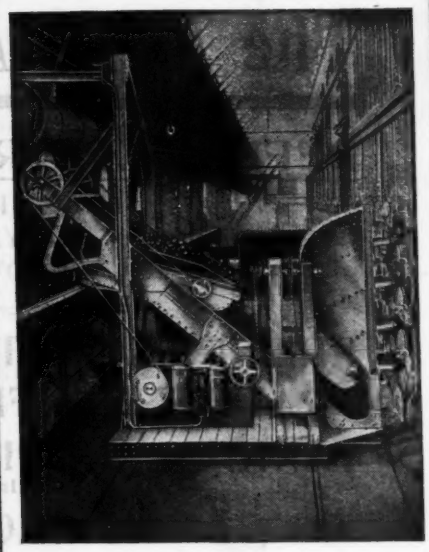

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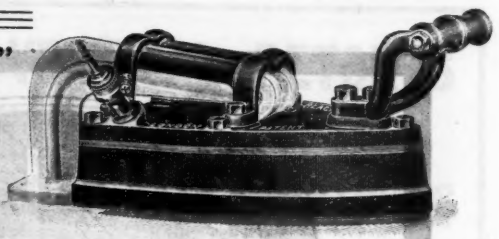

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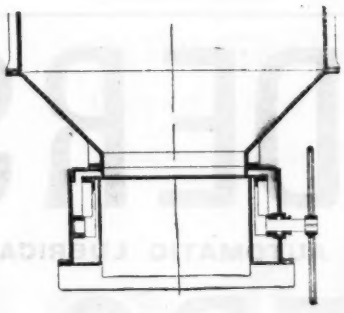

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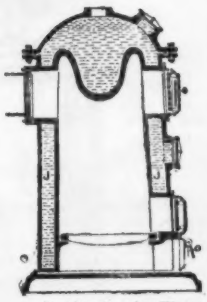

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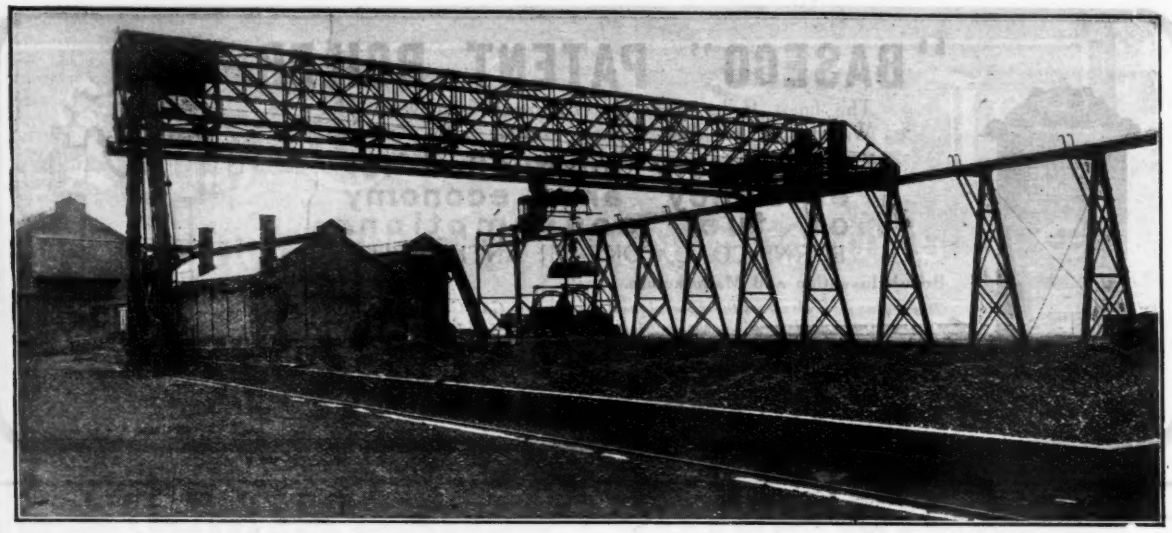

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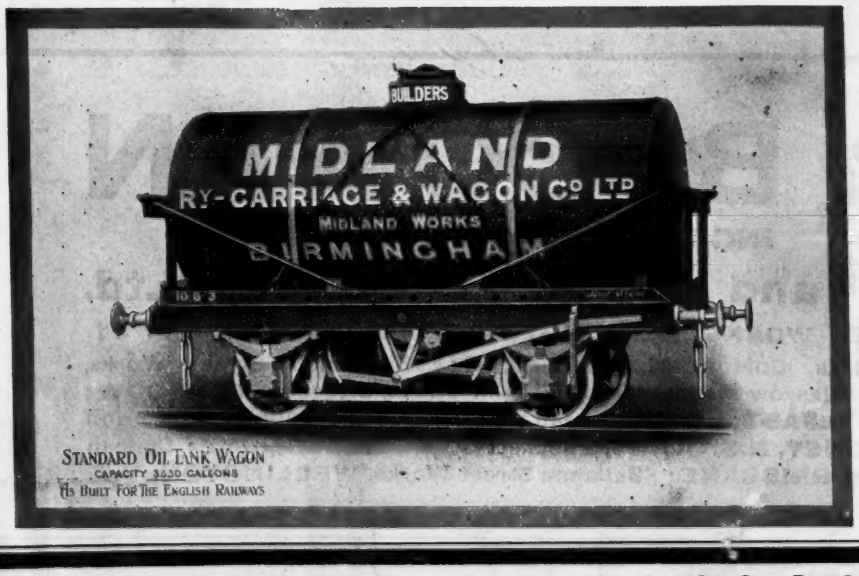

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